



City of Norfolk

Department of Public Works

November 8, 2010

Submitted Online (www.regulations.gov)

Water Docket, Environmental Protection Agency

Mailcode: 28221T

1200 Pennsylvania Ave., NW.

Washington, DC 20460

Docket ID No. EPA-R03-OW-2010-0736

Re: Draft Total Maximum Daily Load (TMDL) for the Chesapeake Bay

Ladies and Gentlemen:

The City of Norfolk (City) has reviewed the proposed Chesapeake Bay (Bay) Total Maximum Daily Load (TMDL) developed by the Environmental Protection Agency (EPA). The residents of Norfolk benefit directly from the Bay through tourism, commercial businesses, and recreation. With approximately 140 miles of shoreline, the quality of the Lafayette and Elizabeth Rivers and the Bay, improvements to the quality of the Chesapeake Bay is a primary concern to our coastal community of 240,000. We are committed to doing our part to protect this invaluable resource.

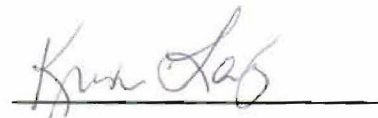
We have commented through our membership in the Hampton Roads Planning District Commission (HRPDC) and Virginia Municipal Storm Water Association (VAMSA) and request that the EPA fully consider and address all of HRPDC and VAMSA comments, which we generally support and hereby incorporate as attachments. We have also submitted additional comments of particular concern for the City. Attached is a detailed discussion of technical concerns and recommended revisions to the proposed TMDL.

Although the City realizes that the EPA proposed TMDL and Virginia Watershed Implementation Plan (WIP) are necessary steps in the direction to improve water quality in the Chesapeake Bay watershed, we cannot support the TMDL in their current version. We recommend that the EPA consider extending the TMDL development until May 2011, allowing additional time for public review and comment. We also recommend the EPA consider allowing the Commonwealth of Virginia to continue to ramp up and implement the Tributary Strategies previously developed to address the health of the Bay. It is important to recognize the costs to

implement these proposed goals need to be balanced with the resources that can reasonably dedicated to this effort.

We look forward to continuing dialog with the EPA and the Commonwealth of Virginia to address our comments and recommendations herein and to improve the health of this national treasure.

Sincerely,

A handwritten signature in cursive script, appearing to read "Kristen Lentz", is written over a horizontal line.

Kristen Lentz, PE
Acting Director of Public Works
City of Norfolk

Enclosures

cc: Doug Domenech., Virginia Secretary of Natural Resources

Attachment A

**City of Norfolk Comments Regarding
Draft TMDL**

Clean Water Act Section 303(d): Notice for Public Review of the Draft Total Maximum Daily Load (TMDL) for the Chesapeake Bay
Document ID: EPA-R03-OW-2010-0736-0001
Document Type: NOTICES
Docket ID: EPA-R03-OW-2010-0736

Representatives from the City of Norfolk (City) have reviewed the proposed Chesapeake Bay (Bay) Total Maximum Daily Load (TMDL) developed by the Environmental Protection Agency (EPA).

The City has always been a leader in storm water management in the Commonwealth of Virginia. We were one of the first Phase I localities to adopt a storm water management program to address storm water runoff. Being the oldest locality and the urban center of the Hampton Roads community, the City experiences many unique challenges in managing storm water including obsolete, aged infrastructure and submerged storm water outfalls with tidal inundation. The City also experiences flooding from both precipitation and tidal sources and is directly impacted by relative sea level rise.

With our commitment to the environment, balancing the needs to improve storm water quality and the City resources is also of paramount concern. The City storm water rates remain the highest in all the Phase I communities in the Commonwealth of Virginia. The substantial increase in storm water rates that will result from Bay TMDL implementation, including the proposed “backstops”, will negatively impact the City’s ability to continue to meet water quality standards and address flood reduction that improves the quality of life and health of our citizens.

The Federal government’s commitment to the environment, in general, and to improve the Bay specifically, regrettably becomes another unfunded mandate on the state and local governments. The requirements placed upon the states within the Bay watershed are burdensome without also providing adequate resources, authority, and time to implement the mandate. The health of the Bay would be better served if the Commonwealth of Virginia and the localities within Virginia continued in a stepped approach to cleaning up the Bay as in the established Commonwealth Tributary Strategies.

The City is committed to restoring the Bay; however, we cannot support the Draft TMDL in its current form. Our concerns, discussed in general terms above, are detailed below. In addition, we have submitted our recommendations to update the Draft TMDL to achieve the water quality goals in an incremental and balanced approach.

I. Insufficient Time

Public Comment Period Time Frame Comment:

Understanding this is a priority at the highest level of the Executive Branch, the EPA has established a self-imposed restricted timeline for both the TMDL and Phase I Watershed Implementation Plan (WIP) development process. The EPA has mandated that the Final TMDL will be issued by December 31, 2010. The EPA released the Draft TMDL on September 24, 2010 with public comments due to EPA no later than November 8, 2010. This 45-day public comment period is an inadequate amount of time for review of this sophisticated complex document.

Simultaneously, the Commonwealth of Virginia, required by the EPA, also released a Draft WIP, for EPA and the public to review; also due not later than November 8, 2010. The EPA then required the Commonwealth to revise the WIP to incorporate any comments from both the public and EPA and to submit a Final WIP to them no later than November 29, 2010.

Because of the compressed schedule, self-imposed by the EPA, the Commonwealth of Virginia will have only three weeks to incorporate public comments into the Final WIP. Furthermore, the EPA will have only seven weeks to address and incorporate public comments from seven jurisdictions.

Implementation Period Time Frame Comment:

Furthermore, the City is concerned about the limited time line the EPA is proposing for implementation, in particular the 60% requirements by 2017 (6 years). Since Virginia is a Dillon Rule state, the City, and all Virginia localities, can only undertake those actions as expressly authorized by the Virginia General Assembly. Even if the General Assembly passed all of the enabling legislation for the localities to have unlimited authorities and tools available to meet the aggressive pollutant loading reductions, local governments would then need to enact ordinance changes once those laws were ratified by the Governor in April 2011. Meaning the best starting point for the Virginia localities is July 2011.

Following General Assembly action, the City would still need to review and revise local ordinances that would be subject to the Virginia Administrative Process Act requirements. These requirements, including public notices, public involvement meetings and public hearings before City Council prior to any ordinance changes being implemented, could take nine months to one year from the time authority is granted by the General Assembly. Assuming no legal challenges, local ordinance changes may not take effect realistically until mid-2012.

To design and build best management practices (BMPs) that would have meaningful impacts on reducing pollutants in storm water will take another nine to fifteen months,

meaning these improvements may not begin to come on line until late-2012 to mid-2013. Measuring the results from these structural BMPs would take another twelve to fifteen months in order to capture a complete season of pollutant removal efficiencies. Based on the legal processes outlined above, it is very unrealistic for the EPA to expect any local government to meet the 60% of the Bay Waste Load Allocation (WLA) by 2017.

Recommendation:

The City recommends that the EPA modify the time line for the Final TMDL and WIP development to extend into May 2011. This additional time would allow for modifications to be made to the Bay Model and to allow for proper public comment review for both the TMDL and WIP.

A noted comment by the EPA on the Virginia WIP is lack of detail and commitment on program implementation. By extending the dead line for the Final TMDL and WIP into May 2011, it would allow the General Assembly for the Commonwealth of Virginia to begin approval of storm water legislation, providing the necessary commitment as outlined in the state WIP.

The time required for authorization and implementation of local ordinance changes and engineering logistics of BMP installation are described above. The City recommends extending the deadline for TMDL implementation to 2030 and requiring 60% implementation by 2022. This additional time encourages proper consideration of local impacts and engineering principles, respectively.

II. Bay 5.3 Computer Model

Comment:

The Bay model is currently flawed and will continue to need refinement by the EPA in 2011. Portions of the model have not been made public in order to be included in this public review. Notwithstanding, the sheer size and complexity of the model makes it impossible for the localities and the general public to comprehend its details in 45 days. Consequently, neither the localities nor the general public will be able to determine the full implications of the pollutant loading reductions, much less be able to comment intelligently on them.

Since the WLA is established based on this model, it is extremely important that whatever version of the Bay Model being utilized by the EPA be as accurate as possible and understood by the localities and general public. The pollutant load reductions established by the model can then be enforced throughout the Bay watershed through the TMDL and other Clean Water Act permitting programs.

It is unclear how the EPA is proposing to mandate that states and local governments meet WLAs set by a flawed model. As proposed by the EPA, the revisions being made to the Bay Model in upcoming years will adjust for flaws in the current computer model,

version 5.3. This implies that EPA will change the WLAs for individual states and local governments. Without accurate WLAs and reduction targets, the states, local governments, and private interests have no clear metric to anticipate how they intend to meet them.

The model lacks adequate information on groundwater nutrient cycling and detailed information at the jurisdictional level including storm water BMPs, both structural and non-structural, currently incorporated to meet water quality standards. Also, the EPA used satellite imagery to determine impervious area verses taking the time to acquire accurate information from the state or local governments. The EPA has admitted that the satellite imagery process used has included nearly 1,000 acres of misclassified land within the model.

The current computer model also fails to take into account the location of each state and watershed relative to the overall Bay watershed. Hampton Roads, specifically the James River watershed, clearly has minimal impact to water quality in the upper reaches of the Bay by its proximity alone.

Recommendations:

The City suggests that the EPA adopt nutrient reductions based on the Tributary Strategies until the Phase 5.3 Bay Model can be revised and calibrated to properly set the nutrient allocations. The EPA should also utilize data collected from state and local governments to ensure accurate information is inputted into the database system. The model should also include consistent simulations of the chlorophyll standards as set for the James River and also include ground water nutrient cycling. Lastly, the EPA should provide the model, a detailed explanation of the model, and adequate time for public review prior to the closing of the public comment period or implementation of the TMDL.

III. Economic Impact of Implementation

Comments:

A study by the Hampton Roads Planning District Commission (HRPDC), conducted on behalf of the City and the other Hampton Roads localities, was performed to develop a preliminary cost estimate for implementing the storm water pollution reductions for the Bay TMDL. The cost estimate was based on the following assumptions, however does not include land acquisition or easements for the construction of BMPs on private property:

- Urban acreage data that was included in Bay model
- Cost per acre treated by various structural BMPs based on a study performed by the Center for Watershed Protection
- Treating 19% of urban land with BMPs, which was the average maximum amount of practical application of BMPs across Hampton Roads

- Collecting, storing, and reusing storm water to meet the pollutant reductions that cannot be met with BMPs

Virginia WIP Requirements: Should the EPA and Virginia agree and proceed with the nutrient credit exchange program as outlined in the Draft WIP, the estimated cost per year for the City would be \$15M for the installation and retrofit of BMPs alone. This estimate does not account for storm water system maintenance nor flood reduction projects. The estimated cost includes treatment of 19% of urban land with storm water BMPs in addition to requiring the agriculture or wastewater sector to make additional reductions. However, the reductions made to agriculture or wastewater are two orders of magnitude cheaper per pound of phosphorus than requiring those reductions to be made in traditional storm water retrofits or BMP installation (i.e. \$100/lb for agriculture and \$200/lb wastewater compared to \$15,000(or more)/lb for storm water).

EPA Backstop Requirements: Should the EPA impose the backstops or treatment of 50% of urban land in the Virginia TMDL, the City would likely be required to implement BMPs on all municipally owned lands and condemn significant private property for additional BMPs. The City would spend \$15M on BMPs described above and another \$84M per year on storm water storage and reuse; bringing the total annual cost to Norfolk residents at \$99M per year.

The revenue generated by the storm water utility for the City in FY10 was \$11.1M and is estimated to be \$10.8 M in FY11. These funds are used for storm water system repairs and upgrades, operation and maintenance of storm water pump stations, flood reduction, and also water quality improvement. In order to meet the requirements outlined above, the City will have to increase the storm water revenue 2 to 10 times the existing rates. In light of the economic recession, it would be detrimental to Norfolk residents to increase their rates at this magnitude.

Recommendations:

The City of Norfolk recommends that the EPA consider extending the timeframe as outlined above to give the Commonwealth of Virginia time to strengthen the WIP to avoid the EPA proposed backstops.

IV. EPA Backstop – 50% Retrofit of Urban Lands

Comment:

The EPA has proposed a backstop to retrofit 50% of urban lands to address discrepancies between the WIP and the WLA. Being a fully developed urban locality, it would be unrealistic for the City to meet the EPA backstops of retrofitting 50% of its urban land. The City has a total area of 15,340 acres of land, of which only 2,538 acres are municipally owned lands, according to data provided by the Norfolk Real Estate Assessor's Office. Assuming it is feasible to install BMPs on all municipal lands, the

City could only retrofit 16.5% of our urban land. The remaining 33.5% of urban land requiring retrofit is privately owned.

The City does not have the legal authority to require private property owners to install or retrofit BMPs unless the property owner decides to develop or redevelop their land, triggering local land use approvals. In order to meet the 50% retrofit requirements, the City would have to buy private property, offer monetary incentives or take on additional maintenance requirements in order to retrofit BMPs, further stressing the existing storm water revenue. Land acquisition and condemnation is expensive and takes time.

Recommendations:

The EPA has stated that the backstops will only apply if the Commonwealth of Virginia fails to provide concrete details on how they plan to implement the various programs described in the Draft WIP. The City suggests that instead of introducing back stops for the Virginia WIP to include the 50% urban land retrofit, the EPA consider adopting nutrient reductions based on the Tributary Strategies. Furthermore, we recommend extending the deadline for final development of the Phase I WIP to May 2011 to allow the Commonwealth of Virginia time to provide a more detailed and binding WIP as described above.

V. Federal Facility Responsibilities

Comment:

The land area of the City is 53.7 square miles. The Norfolk Naval Base, Norfolk Naval Air Station, Navy Saint Helena Annex and the Army's Fort Norfolk facility are located in the City of Norfolk. These federal facilities comprise nearly one tenth of the total land area within the City. The proposed EPA backstop for managing urban runoff is to retrofit 50 percent of the urban land area for storm water runoff. The City feels that the EPA has failed to address waste load allocations from federal lands.

Recommendation:

The TMDL should contain a clear statement that federal lands located within Bay jurisdictions shall be subject to the same waste load allocations and or backstops imposed by the EPA to ensure that the pollutant reductions are achieved by all point source dischargers equitably. EPA should clearly state how they will assist state agency personnel in monitoring implementation of commitments made by federal agencies on federal lands and provide enforcement assistance if necessary. Federal progress to meeting the WIP and/or backstops should also be publically reported in two-year milestones.

Although the City realizes that the proposed TMDL and WIP are a step in the right direction to improve water quality in the Chesapeake Bay watershed, we cannot support

the TMDL in its current state during this time of economic recession, in light of so many discrepancies and uncertainties associated with the Bay model. We highly recommend that the EPA extend the TDML development until May 2011, allowing additional time for public review and comment. We also recommend the EPA consider allowing the Commonwealth of Virginia to continue to ramp up and implement the Tributary Strategies.

We look forward to continuing to work with the EPA and the Commonwealth of Virginia to address the above-noted concerns and comments to improve the health of the Bay.

Attachment B

City of Norfolk Comments Regarding Draft Virginia Watershed Implementation Plan

Comments Regarding the Commonwealth of Virginia Draft Chesapeake Bay TMDL Phase I Watershed Implementation Plan

The City of Norfolk (City) appreciates the opportunity to review the Virginia Draft Phase I Watershed Implementation Plan (WIP), released in September 2010, and submit comments. As a coastal community, receiving direct benefit of a cleaner Chesapeake Bay, the City has always been a leader in storm water management in the Commonwealth of Virginia and supports the goals of the Chesapeake Bay (Bay) Total Maximum Daily Load (TMDL) and WIP process.

The City recognizes Virginia's efforts to incorporate flexibility and cost effectiveness into the development of the Draft WIP. We support a WIP that ensures adaptability and fairness within and between source sectors in achieving pollutant loading reductions within the Commonwealth.

The City has reviewed both the Draft TMDL developed by the Environmental Protection Agency (EPA) and the Draft WIP developed in conjunction with and response to the TMDL. The City has reservations about the WIP and the potential implications it may mean to our residents. While we have also commented through our membership in the Hampton Roads Planning District Commission and Virginia Municipal Storm Water Association, we wish to submit additional comments of particular concern for the City.

The City understands the pressures and influence that the EPA has placed on the WIP development process; however, we believe a more fair and balanced approach must be taken to address contributions of each watershed to the pollutant loads. Because the James River discharges at the mouth of the Bay, it contributes the least amount of pollutants to the Bay. We find that implementing the Draft WIP as proposed would place substantial financial burdens on City residents with minimal improvement to water quality. Therefore, outlined below are comments reflecting specific concerns and recommendations associated with the Draft WIP.

I. Nutrient Credit Exchange

The Nutrient Credit Exchange program is a creative and adaptable means of reducing the target pollutants from entering the Bay. We are concerned with the high reliance on the availability of credits from the point source and agriculture sectors to assist the Municipal Separate Storm Sewer System (MS4) in attaining their sector allocations. The City may not be able to rely on the exchange of credits from an independent agency to balance storm water reduction loading as suggested in the Draft WIP. We believe that the state has failed to provide adequate details in the Draft WIP on how exchange program will be managed, thereby leaving the localities unable to thoroughly consider the impact of this program.

There is no assurance from the State or the EPA that nutrient credits generated beyond the boundaries of one permitted MS4 will account for waste load allocations (WLAs) required within a different MS4. The ability to generate nutrient credits in a highly developed area such as Norfolk, with minimal agricultural exchange opportunities, is extremely limited. If trading across MS4 boundaries is not *explicitly* allowed nor managed at the state level, the use of nutrient credits by Norfolk for meeting its required storm water load reductions will be greatly limited.

Additionally, as you are aware, many municipalities in Virginia participate in regional waste water collection districts. City residents, for example, are customers of the Hampton Roads Sanitation District for wastewater treatment. These point source districts are issued their own allocation within the TMDL. There is no assurance that the sanitation districts will generate the additional credits when, where, and in the amount they will be needed to offset MS4 requirements. Also, a credit program with point source sectors is generated from excess flow capacity. With population growth in this highly developed urban area, the credit exchange program would only be available to the MS4 on a temporary basis.

The reductions that would be required of urban runoff with the Draft WIP allocations are so great that the demand for credits could exceed the supply in both available agriculture or point source sectors. The limited credits available for exchange will thus drive up demand and costs and limit their availability to Norfolk, particularly if Norfolk is forced to compete with private developers for those scarce credits. Due to the limited credits available for exchange, the program as outlined in the Draft WIP may have long-term financial consequences for the residents of a permitted MS4 such as Norfolk.

For the Nutrient Credit Exchange program to be successful, the Commonwealth would need to manage its implementation and associated agreements. This would add a substantial organizational element that needs to be outlined in the Final WIP.

II. Allocations

The EPA James River basin backstop allocations for the urban runoff sector are higher than those assigned in the Draft WIP because the EPA does not consider nutrient credit exchange. However, with an average reduction of a 54 percent reductions in phosphorus required to achieve the backstop allocation, it is still beyond a level that is practicable given Norfolk's hydrology, geology and available commercial technologies. To achieve the 54 percent phosphorus reduction, the City would be required to treat approximately 65 percent of the impervious land area with structural best management practices (BMP).

The City owns approximately 2,500 acres of land within our boundaries. These holdings contain only 16.5 percent of the required impervious land area that would require treatment to achieve the EPA backstop. The remaining reductions would need to be achieved with retrofits on private land.

Under current state law, localities do not have the authority to compel private land owners to retrofit storm water treatment in the absence of development or redevelopment. Consequently, the City would have to purchase the land needed for easements. Land acquisition is an expensive and time consuming process that will add greatly to the cost and time required to achieve the reductions. Current state law limits localities from condemnation except for very specific purposes. These laws will also need to be amended in order to implement these programs.

It is estimated that the cost to the residents of Norfolk would be approximately \$1.4 billion by 2025 to reduce phosphorus loads to comply with the backstop allocations. This cost includes designing BMPs that would function effectively on the flat, low-lying terrain and in the high water tables that make up the physical setting of the City. Furthermore, the cost estimate outlined above does not reflect the added cost of acquiring the land needed for the installation of structural BMPs and long-term maintenance of those systems.

Neither the EPA nor the Commonwealth has explained how BMPs will be accounted for when determining compliance with the nutrient and sediment allocations. It is unknown how the efficiencies of structural BMPs will be set. Currently state storm water regulations do not acknowledge the added efficiencies for BMPs in series. Further, EPA and Virginia fail to account for non-structural BMPs.

Additionally, it is impossible to predict the full extent of the socio-economic consequences of attempting to undertake an effort of this magnitude because such an undertaking has never been tried before. However, we can state with confidence that there is no assurance that the load reductions that would be required to achieve the backstop allocations can be accomplished by the 2025 deadline, and that, on a pound-for-pound basis, the cost would be out of proportion to any water quality benefits.

III. Recommendation:

Reasonable Assurance

The City encourages Virginia to respond to the EPA backstop allocations by revising its Draft WIP to include the additional commitments needed demonstrate to the EPA with reasonable assurance that the Commonwealth can achieve the Draft WIP allocations for the agriculture and onsite septic systems sectors. Such a demonstration would remove the backstop allocations and allow Virginia to distribute a portion of the allocations now assigned to the agriculture sectors to the urban runoff and point source sectors.

Realign Allocations

Should the EPA backstop pollutant allocations not come into play, the City encourages Virginia to assign a significant portion of the additional allocations of nutrients and sediment in the James River basin to the urban runoff sector. However, as explained above, the allocations in the Draft WIP placed too much reliance on credits to offset the

consequences of the small allocations to the urban runoff sector and did not reflect a cost-effective and equitable distribution among the sectors.

The City would like to take this time to thank you for the opportunity to submit these comments associated with the Draft WIP. We recognize that the state is attempting to develop the WIP to allow for flexibility and cost effectiveness throughout the source sectors. We feel that the state is making great strides to improve water quality in the Bay watershed.

Attachment C

**HRPDC Comments Regarding
Draft TMDL**



November 8, 2010

Submitted Online (www.regulations.gov)

Water Docket
Environmental Protection Agency
Mailcode: 28221T
1200 Pennsylvania Ave., NW
Washington, DC 20460

Re: EPA Water Docket ID No. EPA-R03-OW-2010-0736, Draft Total Maximum Daily Load ("TMDL") for the Chesapeake Bay

Dear Ms. Jackson:

The Hampton Roads Planning District Commission (HRPDC) appreciates the opportunity to submit these joint comments on behalf of the cities of Chesapeake, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, and Williamsburg, and the counties of Isle of Wight, Gloucester, James City, Surry, and York on the Environmental Protection Agency's September 2010 draft Chesapeake Bay Total Maximum Daily Load (TMDL).

The cities of Chesapeake, Hampton, Newport News, Norfolk, Portsmouth, and Virginia Beach own Municipal Separate Storm Sewer Systems (MS4s) that operate under individual Phase I MS4 NPDES permits issued by the Virginia Department of Conservation and Recreation (DCR), while the cities of Poquoson, Suffolk and Williamsburg, and the counties of Isle of Wight, James City, and York own MS4s that operate under a general Phase II MS4 permit issued by DCR. At present, Gloucester and Surry are not designated as MS4s, but could be so designated in the future due to population growth or modification of the criteria used to designate MS4s.

At the Commission meeting on October 20, 2010, the HRPDC acted to endorse the following position and attached comments.

- The cost of achieving the urban runoff sector allocations per EPA's backstop allocations would place an unreasonable financial burden on the residents of Hampton Roads. The estimated \$1.05 billion in annual costs equates to a total average annual storm water fee of \$1,670 per household equates to 2.3 percent to 3.0 percent of median household income (MHI).
- The EPA has not provided reasonable assurance that the urban runoff sector allocations can be achieved by 2025.

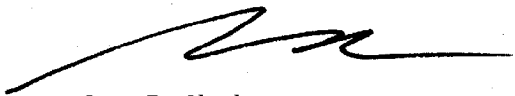
November 8, 2010

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- The EPA does not have the legal authority to establish a deadline in the TMDL.
- The EPA does not have the legal authority to establish a deadline in the TMDL.
- The EPA has failed to provide the localities with a reasonable opportunity to review, evaluate, and comment on the basis for the proposed allocations.
- The Phase 5.3 model and model inputs are not sufficiently developed to produce reliable predictions.
- The modeling predictions do not justify use of the chlorophyll-a criteria as the basis for the James River basin allocations.

Attached is a detailed discussion of technical concerns and recommended revisions to the proposed TMDL. We look forward to continue working with the EPA to address the above-noted concerns and to continue improving the Chesapeake Bay water quality programs.

Sincerely,



Stan D. Clark
Chairman

Attachments

Copies: Doug Domenech., Secretary of Natural Resources
Hampton Roads General Assembly Delegation
Hampton Roads Planning District Commission

**Comments on the Draft Chesapeake Bay TMDL by the Hampton Roads
Planning District Commission on behalf of the Hampton Roads
Localities**

Docket Number EPA-R03-OW-2010-0736

November 5, 2010

I. INTRODUCTION

The Hampton Roads Planning District Commission (HRPDC) appreciates the opportunity to submit these joint comments on behalf of the cities of Chesapeake, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, and Williamsburg, and the counties of Isle of Wight, Gloucester, James City, Surry, and York (“Hampton Roads Localities” or “Localities”) on the U.S. Environmental Protection Agency’s (EPA’s) September 24, 2010 draft Chesapeake Bay Total Maximum Load (TMDL). The TMDL proposes total nitrogen (TN), total phosphorus (TP), and sediment allocations for the Chesapeake Bay’s 64,000 square mile watershed, including “backstop” allocations for the James River and York River basins. EPA used a series of models, including EPA’s new Phase 5.3 Watershed Model (“Phase 5.3 Model” or “Model”), and inputs to the models to derive the proposed allocations, which EPA characterizes as a “pollution diet” needed to restore the Chesapeake Bay and protect the James River. See Draft September 24, 2010 TMDL Report (TMDL Report) at pages i-iv.

The cities of Chesapeake, Hampton, Newport News, Norfolk, Portsmouth, and Virginia Beach own Municipal Separate Storm Sewer Systems (MS4s) that operate under individual Phase I MS4 NPDES permits issued by the Virginia Department of Conservation and Recreation (DCR), while the cities of Poquoson, Suffolk and Williamsburg, and the counties of Isle of Wight, James City, and York own MS4s that operate under a general Phase II MS4 permit issued by DCR. At present, Gloucester and Surry are not designated as MS4s, but could be so designated in the future due to population growth or modification of the criteria used to designate MS4s. All or parts of the MS4s are identified in the James River Tributary Strategy as located within the James River watershed. Parts of the Hampton, James City County, York County, and Williamsburg MS4s are identified in the York River Tributary Strategy as located within the York River watershed as is part of Gloucester County. **Exhibit A** is a descriptive summary of the Localities’ MS4s and their storm water control programs.

At the outset, the Hampton Roads Localities wish to make clear that they are supportive of the TMDL’s goals as reflected in their ongoing commitment of significant resources to implementation of their MS4 programs. Further, the Localities are supportive of and are prepared to commit more resources to their MS4 programs if needed to help restore the Chesapeake Bay and protect the James and York rivers, but the

commitment of more resources must be supported by sound science. Unfortunately, however, as explained below, the TMDL lacks a sound scientific basis. Consequently, the Localities have very little confidence in the accuracy of the James and York river basin-wide backstop allocations in general and the urban runoff sector backstop allocations in particular. Further, even if one assumes for the sake of argument that these allocations accurately reflect the load reductions needed to restore the Bay and protect the James and York rivers, the magnitude of the tasks and estimated costs of achieving the load reductions are so great that it is not reasonable to expect that the reductions can be attained by EPA's 2025 deadline.

II. EPA HAS NOT PROVIDED REASONABLE ASSURANCE THAT THE URBAN RUNOFF SECTOR ALLOCATIONS CAN BE ACHIEVED BY 2025

Virginia's September 2010 draft Phase I Watershed Implementation Plan (WIP) proposed allocations for the urban runoff sectors in the James and York river basins that would have required the Localities to reduce TP loads from their MS4s in the James River and York River basins by an average of 77 and 79 percent, respectively, from current loads.¹ The TMDL rejects the basin sector allocations proposed in the WIP, and in their place proposes backstop allocations that reduce the overall James and York basin allocations proposed in the WIP and transfers portions of the point source allocations to the agriculture, onsite septic system, and urban runoff sectors.² The backstop allocations offer some relief for the urban runoff sector (54 and 59 percent TP reductions in the James River and York River basins, respectively), but not nearly enough to provide reasonable assurance that the allocations can be attained by 2025. In fact, the following analysis of the controls that would have to be implemented to attain the backstop allocations for the James and York basin urban runoff sectors show that they are not achievable by that date.

The proposed backstop allocations reflect EPA's determination that Virginia's proposed allocations for the agriculture and onsite septic systems were too small in light of the absence of direct federal and state regulatory authority over these sectors. Although the urban runoff sectors gained additional allocations with the backstop, the gains are small and appear to reflect EPA's mistaken assumption that steep load reductions can be achieved by the urban runoff sector because this sector, unlike the agriculture and onsite septic system sectors, is subject to direct federal and state regulatory authority under the National Pollutant Discharge Elimination System (NPDES). However, this assumption fails to recognize the significant economic, technical and legal obstacles associated with controlling nutrient and sediment loads in

¹ The WIP allocations for TN and sediment would have required significant urban runoff source sector load reductions as well, but load reductions that would have been required by the TP allocations were the greatest of the three allocations.

² The backstop allocations are based on EPA's finding that the WIP failed to (1) contain sufficient commitments to provide reasonable assurance that Virginia would achieve the allocations for the agriculture and onsite septic system source sectors, and (2), in the James River, provide for compliance with the chlorophyll-a criteria.

urban runoff within an MS4 - particularly MS4s in coastal regions such as Hampton Roads - as well as the Localities' limited ability to require retrofits on private property.

Exhibit B shows that the average 54 (James) and 59 (York) percent load reduction needed to achieve the backstop allocation for phosphorus would require treatment of approximately 68 and 74 percent of the urban land area in the James River and York River basins, respectively.³ The estimated total costs of treatment are approximately \$9.8 billion (or approximately \$1.05 billion per year⁴) after factoring in the added cost of designing storm water controls that would function effectively on the flat, low-lying terrain and in the soils and high water table that dominate the topography and hydrology in the Hampton Roads area.⁵ However, as explained below, these estimated costs do not include the added cost of acquiring new easements and construction in existing utility easements.

The magnitude of the financial burden that would be imposed on the residents of the Localities cannot be overstated. As shown in **Exhibit C**, the estimated \$1.05 billion in annual costs equates to a total average annual storm water fee of \$1,670 per household, or \$720 per person. These fees, in turn, equate to 2.3 percent of median household income (MHI), and 3.0 percent of MHI when the fees imposed on non-residential land owners are passed onto the consumer. Expressed another way, the estimated annual cost of attaining the allocations (without adding the cost of easement acquisition) represents 118 percent of the Localities' 2009 total annual expenditures for public safety (police and fire) and 37 percent of their total annual expenditures for schools. Further, as high as the estimated treatment costs are, they do not tell the whole story.

Treatment of well over half of the urban land area in the Localities would require extensive retrofits of existing development, most of which would have to be implemented independent of re-development in order to have any hope of meeting EPA's 2025 deadline. This is because re-development rates in the Hampton Roads region do not even begin to approach the rates that would be needed to achieve the backstop allocations entirely through re-development between now and 2025. The Phase I and Phase II Localities own an average of thirteen and three percent, respectively, of the urban land that would have to be treated to achieve the backstop allocations. The remaining urban land is privately owned, and the Localities cannot compel private landowners to install

³ Although Exhibit B shows that the percent of urban land area that would have to be treated to achieve the load reductions needed to attain the total suspended solids (TSS) allocations are greater than the area that would have to be treated to attain the TP allocations, we have used TP as the benchmark for the cost estimates because it represents a mid-point in the percent reductions for TN, TP, and TSS. Further, the controls that will remove TP also serve to remove TSS. It is possible that the costs to achieve the TSS allocations could be higher than the cost to achieve the TP allocations in the York River basin.

⁴ In addition to the cost of designing and installing the controls, the estimated annual cost includes operation and maintenance costs and 30-year bond financing at a 5.5 interest rate.

⁵ The Localities evaluated three control scenarios to arrive at this cost estimate: (1) Scenario 1a - all best management practices (which includes voluntary urban nutrient management plans); (2) Scenario 1b - substituting storage for urban nutrient management plans; and (3) Scenario 1c - more reliance on storage than best management practices. See **Exhibit C**. Scenario 1c was selected as the control scenario reflecting the level of effort that would be required to achieve the allocations given the topography, hydrology, and soils in the coastal region and the Localities' experience to date with urban nutrient management plans.

retrofits in the absence of re-development requiring local land use approvals. Consequently, assuming for the sake of argument that they could meet the 2025 deadline, the Localities would have to acquire extensive easements through negotiation and condemnation for the installation and maintenance of controls. Easement acquisition, in turn, would add billions of dollars and years to the implementation schedule. Further, much of the Locality-owned urban land is utilized for utility infrastructure such as water, sewer, telephone, and electric lines. Even if one assumes that it would be feasible to use this land for storm water controls, the cost of moving or constructing around the utility infrastructure would add hundreds of millions of dollars to the \$9.8 billion estimate and add years to the implementation schedule.

The foregoing analysis shows that controlling nutrient and sediment loads from urban runoff poses many of the same challenges and obstacles as controlling loads from agriculture and onsite septic systems. All three of these sectors will require extensive land-based controls on private property to achieve their respective allocations. EPA, Virginia, and the Localities cannot simply force private land owners to install controls in the absence of direct regulatory authority over the land owner (in the case of EPA and the State) or re-development requiring local approvals (in the case of the Localities). EPA appears to recognize the limits of its own authority over non-point source agriculture and onsite septic systems, but apparently refuses to recognize the limits on the Localities' authority over existing development. The Localities can acquire easements through negotiation or condemnation and install the controls themselves, but easement acquisition under these circumstances is extraordinarily time consuming and expensive.

In summary, it is apparent that EPA has wrongly assumed that the urban runoff sector allocations can be achieved by 2025 by virtue of federal and state regulatory authority over MS4s. In so doing, EPA has failed to recognize that in the absence of re-development requiring local land use approvals, the Localities have no more regulatory authority to require retrofits of existing development than either EPA or the Commonwealth of Virginia. Therefore, even if one assumes that the Localities can afford to spend well over one billion dollars each year between now and 2025 (which they cannot), EPA has not and cannot provide reasonable assurance that the James River basin backstop urban runoff allocations can be attained by 2025.

Having increased the agriculture and onsite septic system sector allocations to provide reasonable assurance that these allocations can be attained, it is incumbent upon EPA to increase the urban runoff sector allocations as well to account for the limits on federal, state, and local regulatory authority over existing development as well as the immense cost and difficulty associated with installing urban runoff retrofits.⁶ Increased

⁶ "Reasonable assurance" is not required by or defined in federal law; however, since EPA has chosen to employ reasonable assurance as the driver for assigning allocations among the source sectors, it is required to apply reasonable assurance among the sectors in a reasoned and consistent manner. The Localities submit that EPA has acted arbitrarily by proposing allocations for the urban runoff sector that do not account for the same factors (i.e., limited regulatory authority and economic feasibility associated with land-based controls) that it used to propose allocations for the agriculture and onsite septic system sectors. In fact, the much higher cost and greater difficulty of controlling nutrient and sediment loads from the urban runoff sector compared to the agriculture sector strongly suggests that on a pound-for-pound basis,

allocations for the urban runoff sector would contribute toward providing reasonable assurance that the sector's allocations can be attained at some point in the future by reducing the extent of the retrofits that would be required to attain the allocations. As discussed below in Section VI, the correct starting point for developing increased allocations for the urban runoff sector would be for EPA to use the James River allocations in the 2005 Tributary Strategies rather than the allocations proposed in the TMDL. The urban runoff sector allocations derived from the Tributary Strategies would have to be significantly higher than those currently proposed by EPA if the Localities are to have any chance of achieving their allocations by 2025. Even with significantly higher allocations, however, it is unlikely that the Localities and private property owners would be able to implement all of the required retrofits by EPA's 2025 deadline because in addition to installing retrofits on public land and requiring retrofits on private land as re-development occurs, the Localities would also have to acquire easements to install retrofits on private land that was not undergoing re-development. As explained in these comments, easement acquisition is an extraordinarily time-consuming and expensive process.

Finally, given the immense costs and difficulty of attaining the urban runoff sector allocations, it is remarkable that the TMDL reflects so little interest on the part of EPA in seriously considering and pursuing additional, more cost-effective opportunities to achieve the basin-wide allocations. While assigning allocations to load reductions attributable to filter feeders such as oysters and menhaden would not provide reasonable assurance that the urban runoff sector allocations can be achieved, it would provide some relief to the impossible burden that the TMDL would impose on the Localities. Also, EPA has failed to aggressively target air deposition in the TMDL for greater load reductions. Atmospheric sources are estimated to account for about one-third of the nitrogen loading to the Bay, yet the TMDL simply accepts existing and planned air regulatory programs as an appropriate level of effort to reduce nitrogen loads from air deposition, much of which originates from outside of the Bay watershed. An aggressive, targeted approach to this large source sector would free-up allocations for the urban source sector, making it more likely that this sector's allocations could be attained at some point in the future.

III. EPA DOES NOT HAVE THE LEGAL AUTHORITY TO ESTABLISH A DEADLINE IN THE TMDL

Nothing in either section 303(d) of the Clean Water Act (CWA) or its implementing regulations gives EPA the legal authority to set a deadline for attainment in the TMDL, nor has EPA cited to any such authority in the TMDL.⁷ EPA's proposed

the load reductions required of the urban runoff sector should be far less than the load reductions required of the agriculture sector. An analysis of the James River sector allocations shows that the level of effort required of the agriculture sector to achieve its allocations is considerably less than the level of effort required of the urban runoff sector to achieve its allocations.

⁷ EPA's own guidance effectively acknowledges that it lacks the authority to impose a compliance deadlines in TMDLs. See New Policies for Establishing and Implementing Total Maximum Daily Loads (TMDLs), Memo from Robert Perciasepe, 4 (Aug. 8, 1997) (stating that "Section 303(d) does not establish

2025 deadline would establish a single schedule in the form of a deadline for achieving compliance with the allocations for all NPDES permitted sources within the Chesapeake Bay watershed. Such a deadline is in direct conflict with EPA's own regulations, which authorize compliance schedules in NPDES permits, not TMDLs. See 40 C.F.R. § 122.47 (providing that a "permit may, when appropriate, specify a schedule of compliance leading to compliance with CWA and regulations.") While this may be EPA's TMDL, it is for the states with delegated NPDES permit programs, not EPA, to establish schedules and deadlines for achieving compliance with the allocations in the TMDL. See 40 C.F.R. § 123.25; 40 C.F.R. § 130.5(b)(1).

It is also well established that schedules of compliance to implement state water quality standards are purely matters of state law, which EPA has no authority to override. See In the Matter of Star-Kist Caribe, Inc., NPDES Appeal No. 88-5, 4 EAB 33, 36 (EAB 1992) (the responsibility of [s]tates under the law to make specific provision for schedules of compliance ... is unequivocal"); In re District of Columbia Water and Sewer Authority, NPDES Appeal Nos. 05-02, 07-10, 07-11, and 07-12, EAB 714, 734 (EAB 2008) ("it is the role of the states, not EPA, to determine whether and under what circumstances compliance schedules may be incorporated in NPDES permits.") Therefore, EPA's attempt to establish a compliance deadline in the TMDL has no basis in the CWA or its implementing regulations, and improperly seeks to override the discretion reserved to the states to establish appropriate schedules of compliance on a case-by-case basis. Thus, the 2025 deadline should be removed from the TMDL.

Aside from the question of EPA's legal authority to establish a deadline in the TMDL, the 2025 deadline would have significant consequences for the Localities because it would directly impact their MS4 programs and their ability to comply with their future permits should the permits contain, as expected, Bay TMDL-derived conditions based on the deadline. The other source sectors would be largely unaffected by the 2025 deadline. Municipal and industrial wastewater treatment plant upgrades are generally completed within the five-year terms of their permits, and while the widespread implementation of agricultural BMPs and onsite septic system retrofits may be a long-term undertaking, the deadline would not expose these largely unregulated sources to either the added costs of attempting to attain the allocations by an enforceable deadline or the risk of enforcement for permit non-compliance. The 2025 deadline would expose the Localities, on the other hand, to future NPDES permits containing retrofit implementation schedules that, as explained above, would, at a minimum, dramatically increase their compliance costs, or more likely, would be unattainable despite their best efforts to achieve compliance by the deadline.

any new implementation authorities beyond those that exist elsewhere in State, local, Tribal or Federal law").

IV. EPA HAS FAILED TO PROVIDE THE LOCALITIES WITH A REASONABLE OPPORTUNITY TO REVIEW, EVALUATE, AND COMMENT ON THE BASIS FOR THE PROPOSED ALLOCATIONS.

A. The length of the comment period is insufficient given the size of the docket and the complexity of the TMDL.

Although EPA has characterized this as the largest and most complex TMDL ever developed, it is providing only a 45-day period to review and comment on the over 2,000 pages of documents posted on the docket. While we recognize that EPA has a certain amount of latitude in establishing the length of its comment periods, we submit that in this case, EPA has abused its discretion and effectively deprived stakeholders such as the Localities with a reasonable opportunity to comment on this very complex and controversial proposal.

The 45-day comment period is inconsistent with Executive Order 12866, which provides that most rulemakings should include a comment period of not less than 60 days, as well as EPA's own Public Involvement Policy, which stipulates that "the comment period for public review of unusually complex issues or lengthy documents generally should be no less than 60 days".⁸ Further, even a 60-day comment period would be too short in this case as reflected in the fact that EPA has established comment periods longer than 60 days for large, complex or controversial proposals such as this TMDL. Examples include EPA's 2010 proposed Water Quality Standards for Florida's Lakes and Flowing Waters (90-day comment period); EPA's 2009 proposed Renewable Fuel Standard (120-day comment period); EPA's 2001 proposed Electronic Reporting Rule (180-day comment period).

B. The opportunity for comment is limited further by EPA's failure to provide all the information and tools needed to review and evaluate the TMDL.

Despite the massive size of the docket, EPA has not provided the public with all of the information and tools needed to effectively review, evaluate and comment on the basis for the proposed allocations. This is also inconsistent with EPA's Public Involvement Policy, which provides that "the comment period should not open until materials are available for the public to obtain and review".⁹ The Localities have tried to overcome this impediment to their opportunity to comment, in part, by posing several written questions and requests for information to EPA in an effort to gain a better understanding of the basis for the urban runoff allocations, but EPA has been generally unresponsive to these questions and requests.

Particularly significant is EPA's failure to make critical components of its TMDL decision support system, such as the Scenario Builder software and reliable Phase 5.3

⁸ See Public Involvement Policy of the U.S. Environmental Protection Agency (EPA 233-B-03-002 - May 2003) at page 13.

⁹ Id.

Model source codes and data, available to the modeling community outside of EPA. Without access to these components, modelers retained by stakeholders such as the Hampton Roads Localities must blindly accept model inputs from EPA and must rely upon EPA to stitch together various patches and workarounds to get the Model to run. This has the effect of making an already inadequate 45-day comment period even shorter as modelers outside of EPA are forced to wait for EPA to run the Model and produce the results, leaving them without adequate time to evaluate and understand the data. Under these circumstances, there is little that the modeling community can do to apply the Phase 5.3 Model in any independent or meaningful manner within the very limited period of time provided by the comment period.

Further, although experts have previously reviewed portions of the Phase 5.3 Model code and data, substantial amounts of the current modeling code and data have been produced at breakneck speed with little or no verification either by the experts who checked portions of earlier versions of the code or by engineers or scientists in academia or the private sector. EPA's blind adherence to an artificial schedule and rollout of the Model and data has effectively prevented—and will continue to prevent—modelers outside of EPA from using the Model to:

- Understand how the complex physical processes are being modeled,
- Validate or check model input or output data,
- Use the Model to analyze pollution treatment alternatives such as BMPs, or
- Contribute to debugging and improving the Phase 5.3 Model through any meaningful testing and feedback processes.

Additionally, as explained below in Section VI, EPA's failure to make available post-processing performed on all of the chlorophyll-a modeling scenario runs has made it extremely difficult for the Localities' consultants to evaluate and comment on the differences in the model runs.

Finally, EPA has not mapped the data used in the Model despite requests for such mapping from the Virginia Department of Conservation and Recreation. The requested mapping would indicate locations of various urban land use categories (such as Impervious High Intensity, Impervious Low Intensity, Pervious High Intensity, and Pervious Low Intensity) used in the Phase 5.3 modeling. Likewise, there is very little documentation that would allow modelers outside of EPA to ascertain specifically how the data was collected and synthesized, which makes working with the Phase 5.3 Model a shot-in-the-dark proposition at the state and local levels. A single scenario run of the Phase 5.3 Model involves hundreds of input data files and produces some 60,000 intermediate and output files. Geographic Information System technology is best used to map this type of data to its sources, but without mapping, there is no way to ensure that sheep are not modeled as grazing in downtown areas, or that urban areas are not modeled as forest (both of which anomalies have been discovered in the Phase 5 model).

V. THE PHASE 5.3 MODEL AND MODEL INPUTS ARE NOT SUFFICIENTLY DEVELOPED TO PRODUCE RELIABLE PREDICTIONS

A. EPA has rushed the Model into service, and in the process has failed to comply with its own quality control standards.

EPA's suggestion that the public and the regulated community should have confidence in the accuracy of the model predictions and resulting allocations because "[t]he TMDL uses a series of models, calibrated to decades of water quality data and other data, and refined based on input from dozens of Chesapeake Bay scientists" (see TMDL Report at page iv) is misleading. While this may be the case for the other models used to develop the TMDL, it is not true for either the Phase 5.3 Watershed Model or its inputs, which are critical elements in the decision support system used by EPA to develop the proposed allocations. The Phase 5.3 Model undoubtedly has greater capabilities than previous versions of the watershed model, but the Model is new, and in its headlong rush to complete the TMDL by an artificial deadline, EPA is using the Model before it is fully calibrated and before verifying the accuracy of the land use inputs to the Model. In fact, EPA has effectively acknowledged that the Model is not ready to produce reliable predictions by its inability to establish the TMDL without a five percent "allocation reserve," its announced intention to begin recalibrating the Model in October 2010 (after the TMDL is released for public comment), and its use of ranges of sediment loading numbers (rather than a single number) for each basin allocation because the Model is unable to match observed data for sediment loading.

EPA has developed many large, complex computer programs and systems that have been tested, improved, and applied by the engineering and scientific community. Recognizing the importance of quality control and quality assurance processes in the development and application of its environmental programs, EPA's Office of Environmental Information Quality Staff published a *Quality Manual for Environmental Programs* (<http://www.docstoc.com/docs/594179/EPA-Manual-EPA-Quality-Manual-for-Environmental-Programs>) in May 2000. The primary goal of this manual is, "[t]o ensure that environmental programs and decisions are supported by data of the type and quality needed and expected for their intended use, and that decisions involving the design, construction, and operation of environmental technology are supported by appropriate quality assured engineering standards and practices." In this case, EPA has failed to meet the standards it set for itself in the Manual.

B. The Model does not produce consistent, reliable results.

The Localities are not suggesting that there must be absolute precision in the Model's predictive capability. However, given the significant widespread financial consequences of even small changes in the Model's outputs, the Localities have every right to expect the accuracy of the Model inputs to be verified and the Model to be fully calibrated so that it produces consistent predictions within a reasonable margin of certainty before the Model is used to develop the TMDL.

The Model's inability to produce consistent predictions is further evidence that it is not ready to be used for TMDL development. EPA distributes the Phase 5.3 Model program in un-compiled form, meaning that in order to run the model users must obtain a FORTRAN compiler and generate the executable computer programs from the source code. However, there is a known and still unresolved problem with the Model producing different results when compiled on different computers. Identical input data was run on different computers in August 2010 for the James, York, and Rappahannock river basins, and the Phase 5.3 Model produced significantly different results, with variations in the answers as high as 36 percent. The reliability of the Model cannot be corroborated until repeatable results can be produced. EPA indicates that it is working on this problem, but again, the demands of EPA's self-imposed deadline to establish the TMDL far exceed the time required to produce a reliable watershed model and modeling results. Development of the Phase 5.3 Model is undoubtedly an ambitious and worthwhile undertaking, but a reasonable amount of time has to be devoted to testing and refining the Model to the point where it can be reliably used to justify billions of dollars in expenditures.

The implications of EPA's rush to establish the TMDL before the Model and model inputs are significant. Many of the allocations are targeted to pollutant reduction levels that are considerably less than the margin of uncertainty in the modeling process itself. As a consequence, the TMDL likely will burden the Localities and many others with extraordinary costs that do not produce a measurable water quality response. Dr. Kathy Boomer¹⁰ of the Smithsonian Environmental Research Center has conducted specific research and noted that the margin of uncertainty in the TMDL component models was much greater than the pollutant loading reductions being sought. Dr. Ken Reckhow with Duke University¹¹ (who chairs the National Academy of Sciences Panel on the Evaluation of Chesapeake Bay Progress Implementation for Nutrient Reduction to Improve Water Quality) notes that TMDL prediction uncertainty is high, and has repeatedly cautioned regulators against reporting modeling results without stipulating the uncertainty. The Localities request that EPA report the uncertainty of the model in the documentation submitted with the final TMDL.

Unfortunately, it is apparent that EPA is intent on papering over the uncertainty in the modeling results and its consequences as reflected in the following from Section 5 of the TMDL Report:

Models have some inherent uncertainty. Because of the amount of data and resources taken to develop, calibrate, and verify the accuracy of the Bay models, the uncertainty of the suite of models is minimized.

Quite the opposite is true - the amount of data and complexity of the system work to increase the uncertainty.

¹⁰ See <http://vimeo.com/12080139>

¹¹ See <http://www.rti.org/page.cfm?objectid=8C8E7BCD-5056-B100-0CC50391AF13C8C4>

C. The Model does not accurately predict the true extent of the TMDL's burdens on the Localities and resulting water quality benefits.

As explained above, the average 54 percent (James River) and 59 percent (York River) load reduction needed to achieve the backstop allocation for phosphorus would require treatment of approximately 68 to 74 percent of the urban area in the Hampton Roads Localities at a total estimated cost of approximately \$9.8 billion plus the costs of land acquisition. EPA concludes from its modeling predictions that this and the other load reductions called for in the TMDL will achieve compliance with the applicable water quality standards, but an analysis of the Model and its inputs indicates that the modeling predictions underestimate the extent of the load reductions that will be required of the Localities' MS4s and overestimate the resulting water quality benefits.

1. Existing imperviousness is underestimated in the Phase 5.3 Model.

EPA has acknowledged the inaccuracies in the land use data used in the Model by setting aside the five percent allocation reserve discussed above. However, this reserve hardly begins to account for the inaccuracies in the data. An analysis of representative Geographic Information System (GIS) land use data from eight of the Localities shows that the satellite imagery used by EPA for its land use inputs to the Model underestimates the extent of imperviousness in the Hampton Roads region by an average of approximately 48 percent. See Exhibit D. The imperviousness data in the Localities' GIS systems is more accurate than the satellite imagery relied on by EPA, but EPA's TMDL development schedule did not allow time for EPA modelers to coordinate and collect this information from the Localities.

The implications of the underestimated extent of imperviousness are significant because it means that the Localities will have to reduce their urban runoff loads based on modeling data that assumes that they are substantially less impervious than they actually are. In other words, the land area that will have to be treated in order to attain the allocations is considerably greater than the approximate 68 to 74 percent of urban land area assumed in the financial impact analysis described above as will the costs and time required to attain the allocations.

2. Groundwater is a substantial transport mechanism for nutrients into the Bay, but the Phase 5.3 Model lacks a groundwater transport capability.

The Phase 5.3 Model does not contain a groundwater transport component - a significant deficiency because groundwater transport of nutrients is a major source of nitrogen loads discharged to the Bay. As noted on the Chesapeake Bay Program's web site¹²:

According to a 1998 study by the U.S. Geological Survey (USGS), groundwater contributed nearly half (48 percent) of the total nitrogen load to streams in the Bay watershed.

¹² Source: <http://www.chesapeakebay.net/groundwater.aspx?menuitem=14716>

Groundwater contributes to river flow, or the amount of fresh water flowing from streams and rivers into the Bay. In a 1998 study, the USGS found that in an average year, of the 50 billion gallons of streamflow that enter the Bay each day, nearly 27 billion gallons are from groundwater. It can take years for groundwater — and the pollutants it may carry — to slowly travel through aquifers before reaching the streams and rivers that flow to the Bay. This “lag time” can make it difficult to determine whether efforts to reduce pollution throughout the Bay watershed are having a positive effect on the Bay’s health.

Ironically, many of the controls that will be employed to achieve the urban runoff load reductions needed to comply with the allocations in the TMDL are based on removal of pollutants by infiltration. Nitrogen and phosphorous are elements, and as such, they persist in nature. The absence of a groundwater component in the Model means that nutrient loads that are routed into infiltration BMPs magically disappear from the computational universe, when, in reality, they are deposited into groundwater that eventually flows into the Bay.

VI. THE MODELING PREDICTIONS DO NOT JUSTIFY USE OF THE CHLOROPHYLL-a CRITERIA AS THE BASIS FOR THE JAMES RIVER BASIN ALLOCATIONS

Subsection 303(d)(1)(C) of the Clean Water Act requires that TMDLs be established at a level necessary to implement the applicable water quality standards. Here, EPA is proposing to establish the TMDL at a level that it asserts is necessary to implement the tidal James River seasonal chlorophyll-a criteria. In so doing, it is proposing to establish the TMDL at a level for the James River basin that will require significantly greater load reductions and costs than would be required to implement the dissolved oxygen and water clarity criteria for the James River and main-stem of the Bay.¹³ EPA may have acted within the scope of its authority in considering the chlorophyll-a criteria as the “applicable water quality standards” for the James River. However, it has failed to offer a reasoned justification for using the chlorophyll-a criteria as the basis for the James River allocations in light of significant unresolved issues

¹³ As discussed below, the Localities maintain that EPA should replace the allocations proposed in the TMDL for the James and York river basins with the allocations in the 2005 James River and York River Tributary Strategies. The Tributary Strategies reflected the Chesapeake Bay Program’s determination that nutrient loadings from these basins have little impact on dissolved oxygen levels in the main-stem of the Bay and that the additional nutrient controls called for in the Tributary Strategies were required for local water quality needs only. Studies conducted since 2005 confirm that this is still the case. Hence, in the absence of a stable, calibrated chlorophyll-a model for the James River, the Tributary Strategies’ allocations continue to reflect the best science available for establishing allocations for the James and York river basins. Comments on the TMDL submitted by the Virginia Association of Municipal Stormwater Agencies (VAMSA) contain a more extensive and detailed analysis of this issue. In the interest of brevity, the Localities adopt and incorporate VAMSA’s comments and attached exhibits and appendices by reference rather than repeating them here.

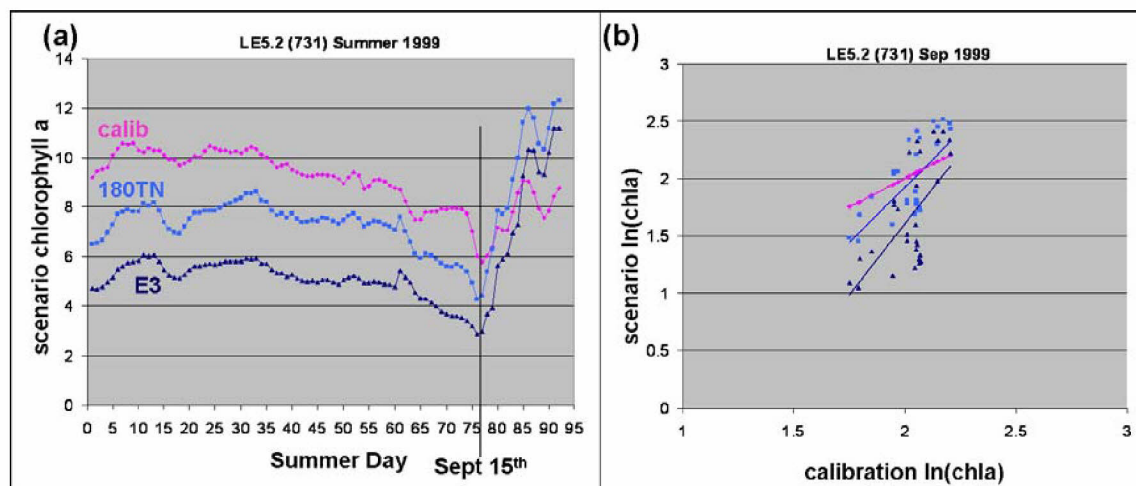
related to the accuracy of the chlorophyll-a modeling predictions and resulting absence of any quantifiable water quality benefit from the billions of dollars in additional expenditures that will be required to meet the proposed chlorophyll-a criteria-based allocations.

A. The chlorophyll-a water quality model is not stable, not calibrated properly, and should not be used to establish the TMDL allocations.

Since 2009, the regulated community has urged EPA to address significant issues relating to the accuracy of the chlorophyll-a modeling predictions, including erroneous calibration in certain segments and seasons, model post-processing problems, unexplained model anomalies, and the improper use of data.¹⁴ EPA has not only failed to undertake the systematic review and analysis of the model's predictive capabilities needed to fix these problems, it has improperly manipulated the model. Specifically, while EPA was attempting calibrate the model, it found that when using data from the September 1999 timeframe, chlorophyll-a concentrations were going up rather than going down as loads were reduced as shown in **Figure 1**. But rather taking the time to find and correct the source of the problem, EPA simply eliminated the September 1999 data to produce the result it was seeking. EPA has offered no explanation for why the model was not working properly nor has it offered a justification for deleting the data. If EPA is going to disqualify data, it should at least explain why it is being disqualified.

Figure 1¹⁵

“Anomaly in some driver of the model simulation that caused poor scenario performance in the latter half of September 1999 at LE5.2”



¹⁴ See letter dated August 16, 2010 and attachments from the Virginia Association of Municipal Wastewater Agencies (VAMWA) to EPA, which is attached to and incorporated in these comments as **Exhibit E**.

¹⁵ From TMDL Report, Appendix O, Figure 6. Plot of simulated surface chlorophyll a concentrations for WQM cell 731 (location of station LE5.2) during the summer of 1999 (a), and resulting regression plot for September 1999 LE5.2 chlorophyll a (b). The quote in Figure 1 is from Appendix O, pg O-5.

Further, EPA provided no reasonable explanation for why the chlorophyll levels increased with decreasing nutrient loads. EPA should recalibrate the model and explain the cause of the model errors. Until EPA recalibrates the model and the model is verified with enough peer review to ensure appropriate reliability in establishing reasonable allocations for the James River basin, the allocation should remain at the “Tributary Strategy” level for the reasons discussed below.

B. EPA has failed to provide documentation related to post-processing of the data.

EPA has made it extremely difficult to evaluate the differences between the chlorophyll-a model runs. In Appendix O to the TMDL Report, EPA only states that it post-processed (manipulated) the data to address the poorly performing model results associated with the “James LOE ½ Potomac” model scenario. However, based on a review of EPA’s “stoplight plots” for chlorophyll-a in Table M3 of Appendix M to the TMDL Report, it appears that EPA post-processed only the “James LOE ½ Potomac” scenario and failed to post-process the remaining scenarios. Scenarios with higher allocations in the James River should have been post processed and published to allow public review of the results and the relative attainment rates for different load allocations.

Exhibit F¹⁶ includes a series of four tables (“stoplight plots”) for the “91-00 Base”, “Tributary Strategy”, “190/12.7 Loading”, and “James LOE ½ Potomac” scenarios for each of the three-year rolling average for the periods between 1991 through 2000 that EPA uses to assess compliance. Each table includes percent non-attainment of the chlorophyll-a water quality criteria for each of the five model segments of the James River shown in **Figure 2**. The blacked data points shown in **Exhibit F** for the JMSTFL and JMSPH segments in the “James LOE ½ Potomac” model scenario represent chlorophyll-a model output that was not considered reliable by EPA. Once post-processing of the data was completed, the JMSMH segment showed only 1% non-attainment, which EPA indicated was sufficient to establish the James River basin allocations for TN and TP loads at 23.5 and 2.35 million pounds per year, respectively. However, there are no records in the TMDL Report or its appendices for the percent non-attainment for the JMSMH segment prior to the post-processing for the ’97-’99 or ’98-’00 summer periods shown in **Exhibit F**. Therefore, we have undertaken the following analysis of the data to compare the scenarios.

¹⁶ Data extracted from Table M3 of Appendix M to the TMDL Report.

Figure 2
James River Model Segments



EPA's PowerPoint presentation in early summer 2010 showed the percent non-attainment rates for the "190/12.7 Loading" scenario after post-processing of the model results. **Exhibit G** shows the same four scenario tables ("stoplight plot") as provided in **Exhibit F**, except the post-processing of the data for the "190/12.7 Loading" scenario was applied based on the EPA's June 2010 presentation. **Exhibit G** shows that JMSTFL and JMSPH segments were also not considered reliable by EPA and removed from consideration. EPA reported that the percent non-attainment for the JMSMH segment was reduced from 15 percent in **Exhibit F** to 4 percent in **Exhibit G**, which was based on the EPA's removal of the problem regression data. It is reasonable to assume that the same trend would exist for the "Tributary Strategy" Scenario as shown in **Exhibit G**. The post-processed "Tributary Strategy" percent non-attainment rate for the JMSMH segment would be expected to be about 1 percent higher than the "190/12.7" scenario (based on comparison between **Exhibit F** and **Exhibit G**). Therefore, it would be expected that the "Tributary Strategy" data would attain the standard about 93 to 94 percent of the time. The difference between this attainment rate and the one percent attainment rate that EPA used to develop the proposed allocations is inconsequential considering the fact that (1) EPA has failed to fix the flaws in the model and has had to improperly manipulate the data to make it work, and (2) the difference in modeled chlorophyll-a concentrations between the two scenarios is so small that it is likely to be undetectable.

EPA has indicated that the "190/12.7 Loading" scenario is needed to meet the dissolved oxygen water quality standard in the main stem Chesapeake Bay. However, the 2005 James River Tributary Strategy loading was established based on the

chlorophyll-a criteria, which was well below what was required to comply with the dissolved oxygen standard in the main stem Chesapeake Bay. Additionally, it is well known that the James River has little impact on the Chesapeake Bay given its proximity to the Atlantic Ocean. EPA should provide a model run that keeps all the other segments at the allocations associated with the “190/12.7 Loading” scenario, but increase the James River basin loadings to 27.5 and 3.3 million pounds per year for TN and TP, respectively. It is expected that this model scenario will show that the Tributary Strategy loading in the James River basin will not have a material or measurable impact on the dissolved oxygen in the Chesapeake Bay. Therefore, the allocations for the James River Basin should remain at the “Tributary Strategy” loadings.

C. A knee-of-the-curve analysis further indicates that the James River allocations should be based on the Tributary Strategy

We recognize that EPA has a certain amount of discretion to rely on model predictions as the basis for its TMDLs, even when the predictions are acknowledged to reflect some uncertainty. However, there are limits to the exercise of that discretion; and this is one instance where EPA would be acting arbitrarily because in addition to unresolved flaws in the model, the model predictions are unable to reliably distinguish between model scenarios with immense cost implications as shown in the following knee-of-curve analysis, which was prepared by one of the Localities’ consulting engineers, Greeley and Hansen.

Figure 3

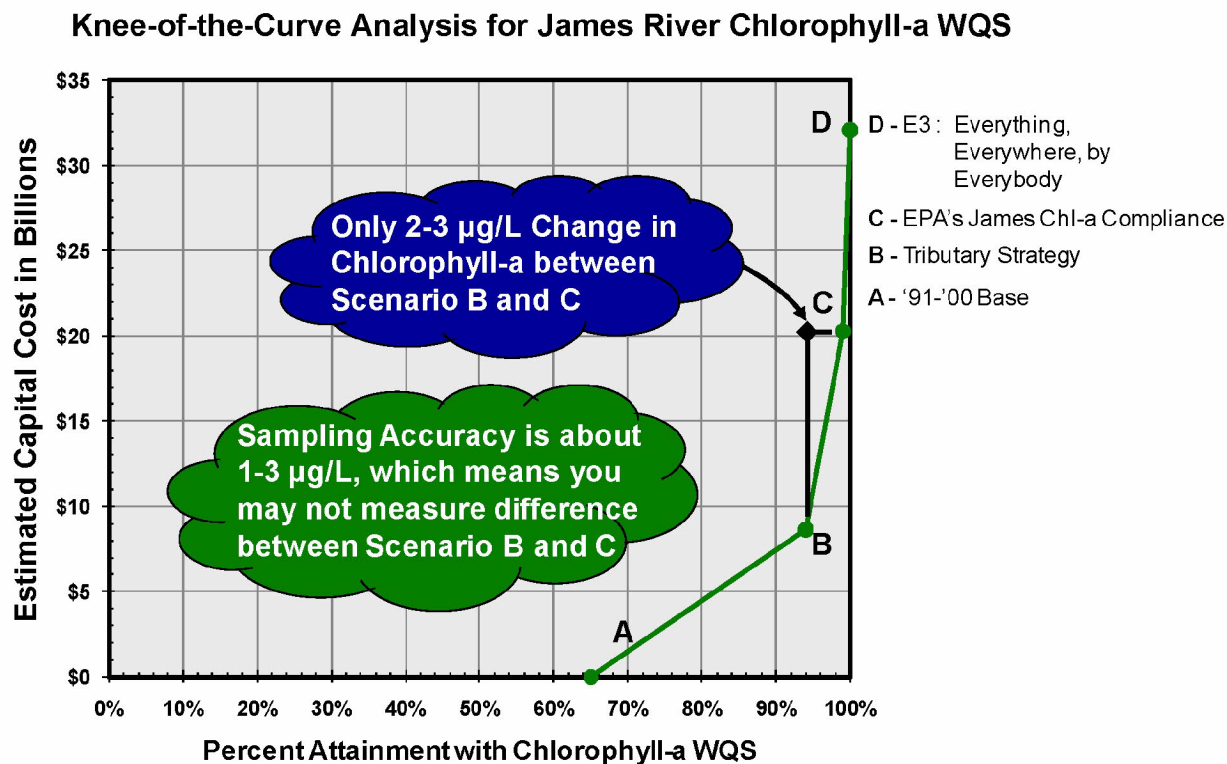


Figure 3 shows the estimated capital costs of attaining the chlorophyll-a criteria against the percent attainment rate. The capital costs include estimates for basin-wide wastewater treatment plant reductions, agricultural BMPs, and urban runoff controls necessary to meet the allocations identified by EPA for the scenarios identified in **Figure 3**. The wastewater treatment plant capital costs are a function of design flows and level of treatment (biological nutrient removal, enhanced nutrient removal and limit of technology). Agricultural capital costs are based on BMP unit cost per acre and the BMP assumptions used in the Phase 5.3 Model. The urban runoff capital costs¹⁷ are based on the performance associated with the runoff reduction method for an estimated amount of retrofit controls that could be installed in a locality, which represents only a portion of the urban runoff costs. The costs for the remainder of the urban runoff reductions needed to meet the allocations would be achieved with storage and reuse. The estimated capital costs were prepared for the following EPA Scenarios:

¹⁷ Urban nutrient management was not included. The capital costs are based on meeting the waste load allocation for the Urban Runoff identified in Appendix Q-1 of the TMDL report.

- '91-'00 Base Scenario: Point "A" represents the James River TN and TP loading of 36.9 and 3.3 million pounds per year, respectively.
- EPA's Tributary Strategy: Point "B" represents the James River TN and TP portion of the Bay-wide loading, which is 27.5 and 3.3 million pounds per year, respectively.
- EPA's James Chl-a Compliance: Point "C" represents the James River TN and TP loading of 23.5 and 2.35 million pounds per year, respectively. EPA has selected this scenario as the basis for compliance with the James River chlorophyll-a criteria. EPA also refers to this scenario as "James Level of Effort at ½ Potomac". In Appendix J to the TMDL Report, EPA states "In the James, the nutrient loads are equivalent to the level of effort half way between Virginia's portion of the Potomac and the James for the 190/12 Loading Scenario."
- E3 (Everything, Everywhere, by Everybody): Point "D" represents the James River TN and TP loading of 16.1 and 1.5 million pounds per year, respectively. EPA considers this to be the "theoretical maximum levels of managed controls on all pollutant load sources". There are no cost and few physical limitations to implementing controls for point and nonpoint sources in the E3 scenario. This scenario is used with the No-Action scenario to define the "controllable" loads, i.e., the difference between No-Action and E3 loads." See TMDL Report at Appendix J.

The knee-of-the-curve analysis determines where the increment of pollution reduction achieved in the receiving water diminishes compared to the increased costs. There is a steep inflection at Point "B" that represents the knee-of-the-curve. Any reduction beyond Point "B" lacks a viable cost-to-benefit ratio and does not reflect a reasonable level of attainment. EPA has selected Point "C" as the basis for the James River compliance with the chlorophyll-a criteria, which is about half way between Point "B" and EPA's E3 scenario (Point "D"). If one assumes that the model predictions are accurate (about which there is substantial doubt), at Point "B", the James River would be 93 to 94 percent compliant with chlorophyll-a criteria compared to 99 percent at Point "C". However, the true difference in chlorophyll model output between Points "B" and "C" is only 2 to 3 µg/L (three parts in a billion). Additionally, the sampling and testing accuracies for physical water measurements is 1 to 3 µg/L. In other words, even if the loadings between Points "B" and "C" were achieved, it is unlikely that the difference in James River chlorophyll-a concentrations could be measured. The difference in the estimated cost of achieving the loadings between Points "B" and "C", on the other hand, is over \$10 billion.

In summary, it is incumbent upon EPA to reconsider the basis for the James River allocations considering the magnitude of the costs of attaining levels of load reductions required to produce a difference in modeled chlorophyll-a concentrations so small that they cannot be reliably measured. At a minimum, EPA should not pass the knee-of-the-curve identified at Point "B" of the above graph. Assuming there is any water quality

improvement beyond Point “B”, it would not be cost effective, could not be physically measured, and could not be reasonably attained. Therefore, James River basin allocations should be based on the Tributary Strategy allocations.

VII. CONCLUSIONS AND RECOMMENDATIONS

EPA has promoted the Bay TMDL as employing an adaptive management approach to restoring the Bay and protecting the James River, yet its approach to establishing the allocations reflects anything but an adaptive approach. Rather than calling for incremental additional load reductions that account for the unresolved significant questions surrounding the accuracy of the chlorophyll-a modeling predictions and the absence of any quantifiable benefit from achieving load reduction greater than those called for in the James River Tributary Strategy, EPA appears to be determined to press ahead with proposed allocations that call for load reductions that may go well beyond those needed to restore the Bay and protect the James River. Adaptive management avoids wasted time and money by providing for the incremental commitment of resources until the applicable water quality standards are attained. EPA’s approach will not achieve compliance with the standards any earlier, but it does pose a serious risk that the Localities and other sources in the James and York river basins will expend far more resources than needed to attain the applicable water quality standards.

If EPA is truly committed to an adaptive management approach to the TMDL, it will establish the TMDL based upon the allocations in the Tributary Strategies while working with the modeling community to address the unresolved issues with the Phase 5.3 Model and the chlorophyll-a modeling predictions. Once these issues are resolved, the TMDL can be updated and modified, if necessary, to reflect allocations based on a fully developed and calibrated Phase 5.3 Model, verified model inputs, and model predictions that (unlike the current predictions) do not have to be manipulated to produce results consistent with the observed data. In the meantime, progress toward attainment of the applicable standards can continue. Much remains to be done to attain the Tributary Strategies allocations so no time will be lost while the work needed to make the Model reliable enough to establish TMDL allocations and fix the model inputs continues,

The approach we recommend would achieve our mutual water quality goals for the Bay more efficiently, cost-effectively, and quickly by fostering the federal, state, and local partnership that is so critical to an undertaking of this magnitude. EPA’s adherence to an artificial deadline for establishing the TMDLs and its heavy-handed approach to date serves only to undermine that partnership and create distrust and resistance on the part of those who must bear the burdens of achieving the load reductions required to restore the Bay and protect the James River.

Finally due to the 64,000 square-mile extent of the Model, there is an inherent problem of scale when addressing urban runoff controls. The Model is better suited for overarching computations on larger scales, such as evaluating the effects of fertilizer applications on large segments of the Bay watershed, than it is in evaluating the effects of a particular control or group of controls on specific sites. EPA has acknowledged that the

effects of individual, site-specific controls cannot be directly addressed in the Phase 5.3 Model.¹⁸ Therefore, we recommend that EPA develop guidance for localities that will allow them to evaluate specific alternative controls consistent with the Phase 5.3 modeling. Such guidance would require EPA to overcome the inherent scale problem in the Phase 5.3 model, problems with BMP efficiency rates, problems with sorting out and correcting the modeling data, and would allow the Localities and other localities with MS4s to make informed, intelligent decisions without requiring them to translate this very complicated technology completely on their own.

¹⁸ EPA Chesapeake Bay TMDL March 25, 2010 Webinar

REGIONAL COOPERATION IN STORMWATER MANAGEMENT

FISCAL YEAR 2009-2010

A STATUS REPORT

**This report was included in the HRPDC Work Program
for FY 2010-2011, approved by the Commission at its Executive Committee
Meeting on June 16, 2010**

**Prepared by the staff of the
Hampton Roads Planning District Commission
in cooperation with the
Regional Stormwater Management Committee**

September 2010

REPORT DOCUMENTATION

TITLE:
**Regional Cooperation in Stormwater
Management Fiscal Year 2009-2010:
A Status Report**

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ABSTRACT

This document describes cooperative activities related to stormwater management undertaken by Hampton Roads local governments during Fiscal Year 2009-2010. Activities described include the Regional Information Exchange Process, Public Information and Education, Legislative and Regulatory Issues, Cooperative Regional Studies and Related Programs and Projects in which the localities participate. One of a series of Annual Reports, this document is used by the region's twelve localities with stormwater permits to assist them in meeting their permit requirements.

ACKNOWLEDGMENTS

The Hampton Roads Planning District Commission, in cooperation with the Regional Stormwater Management Committee, prepared this report.

Preparation of this report was included in the HRPDC Unified Planning Work Program for FY 2010-2011, approved by the Commission at its Executive Committee Meeting of June 16, 2010.

The sixteen member local governments through the HRPDC Regional Stormwater Management Program provided funding.

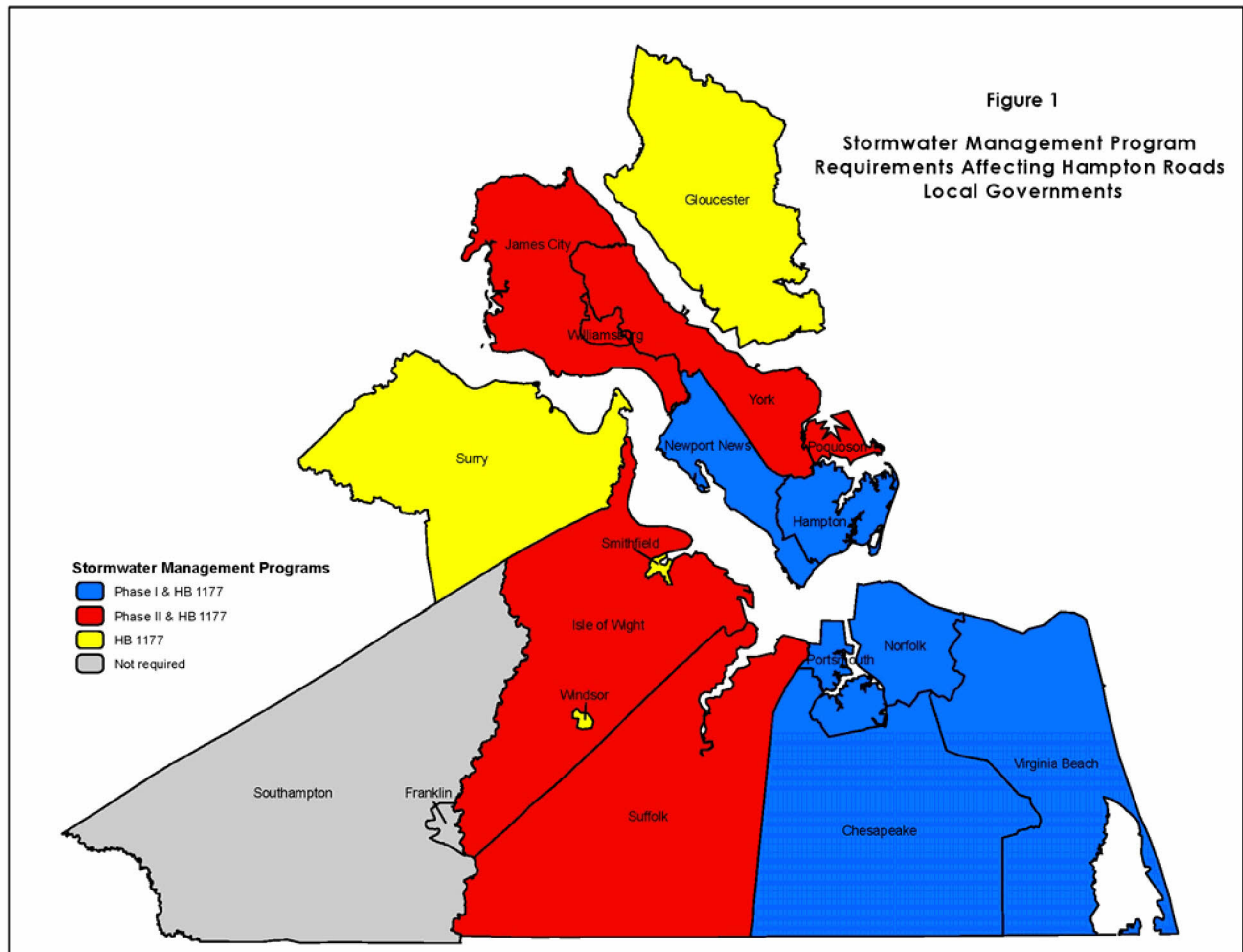
INTRODUCTION

Working through the Hampton Roads Planning District Commission, the region's sixteen member cities and counties cooperated on a variety of stormwater management activities during Fiscal Year 2009-2010. This cooperative effort has been underway as a formal adjunct to the Virginia Pollutant Discharge Elimination System Permits (VPDES) for Municipal Separate Storm Sewer Systems (MS4) held by the Cities of Chesapeake, Hampton, Newport News, Norfolk, Portsmouth and Virginia Beach since Fiscal Year 1995-1996. Cooperative activities documented in this report represent a continuation of an ongoing effort, which has involved concerted activity since 1992.

REGIONAL STORMWATER MANAGEMENT PROGRAM GOALS

The HRPDC and the Regional Stormwater Management Committee undertook a comprehensive effort in FY 1998-1999, called the Regional Loading Study. This effort was completed in September 1999. The project included development by the RSMC of a set of regional stormwater management goals to guide the regional program. The goals were presented to and adopted by the HRPDC at its Executive Committee Meeting in September 1999. They were reaffirmed in the January 2003 approval of the "Memorandum of Agreement (MOA) Establishing the Hampton Roads Regional Stormwater Management Program" and the March 2008 renewal of the MOA. The adopted Regional Stormwater Management Program Goals, which guide the regional program, are:

- Manage stormwater quantity and quality to the maximum extent practicable (MEP).
 - Implement BMPs and retrofit flood control projects to provide water quality benefits.
 - Support site planning and plan review activities.
 - Manage pesticide, herbicide and fertilizer applications.
- Implement public information activities to increase citizen awareness and support for the program.
- Meet the following needs of citizens:
 - Address flooding and drainage problems.
 - Maintain the stormwater infrastructure.
 - Protect waterways.
 - Provide the appropriate funding for the program.
- Implement cost-effective and flexible program components.
- Satisfy VPDES stormwater permit requirements.
 - Enhance erosion and sedimentation control.
 - Manage illicit discharges, spill response, and remediation.



THE REGIONAL PROGRAM

The HRPDC Regional Stormwater Management Committee (RSMC) recommended during FY 1995-1996 that a formal regional program be established at the HRPDC, to be funded by the participating member localities for an initial period of up to three years. The program, established in July 1996, initially focused on activities that supported the permit compliance efforts of the six communities with Phase I VPDES Stormwater System Permits, technical assistance to the region's non-permitted communities and regional education and training to support all of the communities. Development and refinement of the regional program is a cooperative venture between the HRPDC staff and the Regional Stormwater Management Committee. The Regional Program is evaluated annually by the RSMC.

PHASE I LOCALITIES

The efforts of the Phase I localities have again this year centered on negotiating new permit conditions, as well as following the development of changes to the Virginia Stormwater Management Regulations. This intensive rule-making process has involved the work of various state-coordinated Technical Advisory Committees (TACs), in which several committee members and HRPDC staff have participated. In addition, a series of meetings between all of the Hampton Roads Phase I permitted localities, DCR and EPA has been the focus of much work of the committee and staff. Key permit issues have been resolved, while others remain under discussion. The anticipated final draft permit was not completed by the end of calendar year 2009 as expected and the state rulemaking process continues.

PHASE II LOCALITIES

In late 1999, the U.S. Environmental Protection Agency promulgated the final Phase II Stormwater Permit Regulations. To facilitate review of the regulations, the HRPDC staff prepared a "Review and Summary of the Regulations." That review summarized regulatory requirements, highlighted differences between the Phase I and Phase II regulations, noted potential issues that needed to be considered by the Phase II localities in determining their response to the regulations and suggested alternative approaches by which the region's localities could meet the new requirements in a collaborative fashion. That report served as the basis for the region's six Phase II localities moving forward in a cooperative fashion to address the Phase II Permit requirements.

The localities that are covered under Phase II of the Permit Program requested that the HRPDC facilitate a joint approach to development of their permit reapplications and stormwater management program plans, where applicable. Through this cooperative effort, the HRPDC developed a regionally consistent stormwater management program in cooperation with the affected localities. Ongoing activities under the Phase II Permits, which were reissued in 2008, are addressing program development and implementation in a cooperative fashion.

INFORMATION EXCHANGE

The cornerstone of the Regional Stormwater Management Committee's activities continues to be the exchange of information. This is accomplished through regular monthly meetings to address topics of regional importance, as well as crosscutting issues that affect local stormwater, planning, public works and public utilities staff. In addition, various agencies and organizations utilize this regional forum to engage and inform local governments, as well as to gather feedback.

Monthly Meetings

The sixteen communities are represented on the HRPDC Regional Stormwater Management Committee, which meets monthly. These monthly meetings provide an opportunity to exchange information about successful stormwater management techniques, program activities, utility structures and policies, and a myriad of related environmental issues. Cooperating agencies such as DCR, VDOT, HRSD and the US Navy regularly participate in these meetings.

The monthly meetings provide a forum for exchange of information and coordination among the permitted communities, while providing educational background and preparation for staff from the non-permitted localities. Several related state programs, including those implementing the Virginia Stormwater Management Act, Erosion and Sediment Control Law, and Chesapeake Bay Preservation Act, as well as the evolving Chesapeake Bay Program water quality studies, including Tributary Strategies and the delisting of the Bay and its Tributaries as "impaired waters," govern all of the localities. Increasingly, the region's localities are affected by and involved in the state's TMDL (Total Maximum Daily Load) Studies and Implementation Plan processes. Issues associated with these programs are also addressed during the monthly meetings.

During FY 2009-2010, representatives of the Regional Stormwater Management Committee participated with representatives of the other HRPDC Environmental Committees, in assisting the HRPDC staff to design its comprehensive work program. The HRPDC work program continues to include a strategic planning initiative, identified previously as a high priority activity by this group. The Committee continued the long-term effort to better integrate the various reporting requirements associated with the state's stormwater management programs and to explore institutional approaches to further enhance the region's environmental planning and management programs.

State and Federal Agency Program Briefings

Representatives of state and federal agencies frequently brief the Committee on developing issues, regulatory guidance and technical programs. During the year, the Committee was briefed regularly by representatives of the Virginia Department of Conservation and Recreation (DCR) on state initiatives related to the Virginia Stormwater Management Regulations, by representatives of the DCR Division of Chesapeake Bay Local Assistance on various aspects of the CBPA Regulations and associated guidance, by the U.S. Navy on their work, by DEQ staff on the TMDL process and by staff from DCR and DEQ concerning the Chesapeake Bay Program TMDL efforts.

The ongoing activities of both the York River Watershed Council and the Lower James River (Hampton Roads) Watershed Roundtable in support of related water quality initiatives were discussed. The Watershed Roundtable approach is Virginia's preferred approach to nonpoint source pollution management. All members of the RSMC participate in the Roundtables, along with representatives from other local government departments, regional and state agencies, Soil and Water Conservation Districts and private organizations.

PUBLIC EDUCATION

HR STORM

To support development and operation of the stormwater education program, a Public Information and Education Subcommittee consisting of local stormwater education/public information staff was established in 1997. The regional stormwater education program is known as HR STORM. The Public Information and Education Subcommittee (HR STORM) was established during FY 1997-1998 and meets on a monthly basis. The HR STORM Program and its accomplishments for the year are summarized in the HR STORM Program Report for Fiscal Year 2009-2010.

Program funding supports, in part, HRPDC staff members, who also coordinate the region's water conservation education program (HR WET), the regional litter control and recycling education program (HR CLEAN), the regional wastewater (fats, oil and grease) educational program (fatfreedrains.com), as well as other regional environmental education, public information and training programs. The HRPDC staff is facilitating a number of cooperative ventures among these programs, which serve to enhance the effectiveness of all of them. These joint ventures have come to be known as HR Green. In FY 2009-2010, an RFP was circulated for consultant services to assist in more effectively integrating the various educational messages. The firm of Cahoon & Cross has been selected and is currently working on an overall Communications Plan. More detail about this effort is provided in the HR STORM Annual Report.

TRAINING

Since 2004, the HRPDC staff has worked with the six Phase II communities to develop and conduct training programs for local government staff. These programs are designed to assist the localities in meeting the Good Housekeeping Management Measure. Program topics are reviewed and prioritized annually by the Phase II Subcommittee. The HRPDC staff coordinated the logistical and technical aspects of two regional training seminars this year. The first, an Illicit Discharge Detection and Elimination training, was attended by over thirty local government staff members, representing 9 localities within the region. An additional field training on LID practices in the area was coordinated for Phase II localities and was attended by all of the Phase II permittees. Training topics will be reviewed and evaluated periodically. The next training planned will likely deal with municipal parks and open space management, based on the training priorities below, and is tentatively scheduled for Winter 2011.

Topic	Last offered	Previous dates
Fleet Maintenance	Mar 2005	
Landscaping	Mar 2006	
IDDE	Oct 2009	May 2007 Feb 2008
General Pollution Prevention	Feb 2009	Mar 2004
Parks & Open Space Mgt.		
LID Practices	June 2010	

LEGISLATIVE & REGULATORY MONITORING

This element of the program involves monitoring of state and federal legislative and regulatory activities that may impact local stormwater management programs. Based on this monitoring activity, the HRPDC staff develops briefing materials for use by the localities, including consideration by the governing bodies. As appropriate, the HRPDC staff in cooperation with the Committee develops consensus positions for consideration by the Commission and local governments. The level of effort devoted to this element has increased significantly over the past four years. During FY 2009-2010, the regional emphasis was continued participation in the evolving regulatory stormwater program of the Department of Conservation and Recreation, associated guidance and

pending regulations governing local stormwater management programs, permits for construction activities and permit fees.

The HRPDC staff participated on or monitored a variety of state Technical Advisory Committees (TACs) on behalf of localities impacted by various aspects of the Virginia Stormwater Management Program. Local government staff served on the Stormwater Management Regulations Technical Advisory Committee from June 2008 through September 2008. Staff continued to serve on the state BMP Clearinghouse TAC. This TAC was developed to review protocols for proprietary BMP pollutant removal efficiencies, and is a result of a similar regional effort explored by the HRPDC. The State testing and review protocol are currently in development, with recommendations from the TAC requiring approval by the SWCB.

Staff continued to monitor the Stormwater Regulation revision process through FY 2010. Staff and local governments attended meetings of the Virginia Soil and Water Conservation Board and DCR public hearings during Fall 2009 to provide comment and hear community input into the regulatory process. The HRPDC Commissioners were provided periodic updates on the process, as developments warranted.

REGIONAL STUDIES

Extreme BMP Makeover

HRPDC staff has assisted the Center for Watershed Protection with the Extreme BMP Makeover Project. The project involved a broad partnership among Virginia DCR, five early adopter communities and project partners with coordination and technical support provided by the Center for Watershed Protection.

The project emphasized the measurement and tracking of increased nutrient reduction by local communities at the site level through enhanced design of stormwater BMPs. A large portion of this work was incorporated into the revised Virginia Stormwater Management Program (VSMP) Permit Regulations Parts I, II, and III (4 VAC 50-60). While more accurate nutrient tracking systems were developed as a central element of the project, conservative initial computations suggest the project has significant nutrient reduction potential.

Norfolk, Portsmouth, Hampton, and James City County participated in the stormwater BMP survey component of the Study. Surveys were conducted in the Summer of 2008 and results were released in Spring 2009. In March 2010, HRPDC staff presented the Hampton Roads Regional Stormwater Management Program as an example of a monitoring consortium at the Rooftop to Bay Workshop held as part of this grant.

Bacteria Source Tracking

Preliminary work was developed for a regional bacteria source tracking study. Top researchers will verify tracking protocol for the region to identify whether the bacteria sources are human, wildlife or domesticated animals. This information will enable future efforts to minimize bacteria in area waterways to be more effectively targeted. Dry weather sampling was conducted in Shingle Creek in Suffolk and Moores Creek in York County. Investigation of potential bacteria sources in Mill Dam Creek in Virginia Beach has continued over the last year. Wet weather sampling will occur as appropriate. The results of the Study are expected in the Summer of 2011.

Stormwater Program Matrix

A comprehensive stormwater program matrix, including Phase I and Phase II communities, was developed which addresses both utility and programmatic issues. Staff endeavors to keep this information as up to date as possible.

TECHNICAL ASSISTANCE

The HRPDC continues to serve as a clearinghouse for technical assistance to the localities, as well as a point of contact in arranging short-term assistance from one locality to another. The HRPDC Committee process also provides a forum, allowing state regulatory agency staff to meet with the region's localities to discuss evolving stormwater management and other environmental regulations. Comprehensive technical data and information is maintained in the HRPDC library for use by the participating localities as well as the public. In addition, the HRPDC staff provides technical information and advice to all of the participating localities on a wide variety of issues upon request. This past year, the HRPDC staff drafted a stormwater management program for the Town of Windsor, which adopted the program in January 2010. The HRPDC is also frequently requested by localities from other parts of Virginia and adjacent states for assistance due to its experience with stormwater management programs in Hampton Roads.

MEMORANDUM OF AGREEMENT

The Regional Stormwater Management Program was established in 1996 as a formal program of the Hampton Roads Planning District Commission with support and participation from the sixteen member local governments. Due to increasing dependency upon the HRPDC to fulfill various permit requirements for both Phase I and Phase II localities, the HRPDC staff and RSMC developed a Memorandum of Agreement (MOA), formalizing the existing regional program, while providing a structure for future program evolution and regional cooperation. The MOA outlines the basic regulatory and programmatic premises for the cooperative program, incorporating the Regional Program Goals, outlined earlier in this report. It establishes a division of program responsibilities among the HRPDC and the participating localities and establishes the role and responsibilities of the Regional Stormwater Management

Committee. It formalizes the traditional method of allocating program costs, addresses questions of legal liability for program implementation and includes other general provisions. During this fiscal year, the MOA was reauthorized by the signatories.

PERMIT ADMINISTRATION AND REPORTING SYSTEM (PARS)

In an effort to streamline reporting and capture data more effectively for local governments, the twelve permitted localities have pooled resources to develop the Permit Administration and Reporting System, or PARS. Based on local needs and anticipated Phase I permit requirements, as well as changes in the state stormwater management regulations, the region has contracted with URS Corporation to develop a web-based data tracking and reporting system. The first modules of the system are already being utilized by local governments to catalog development sites and their associated best management practices (BMPs). The system also enables localities to capture inspection information, as well as collecting documentation for future inspections or enforcement actions. In addition, localities can use the site to catalog stormwater outfalls, document illicit discharge investigations and record public education information. Users can then query a variety of reports to satisfy the reporting requirements of their stormwater permits. Future modules will be developed as more details of the state regulations and Phase I permits are finalized. It is anticipated that this system will serve as a model for statewide compliance.

RELATED PROGRAMS AND PROJECTS

In various combinations, the twelve (12) MS4 communities, as well as their non-permitted counterpart communities, in Hampton Roads participate in a wide variety of related programs. These programs are noted here because of their relationship with stormwater management.

Chesapeake Bay Program

Over the past several years, the Hampton Roads Region has devoted considerable attention to the ongoing Chesapeake Bay Program (CBP). To facilitate local government participation in Chesapeake Bay Program activities, HRPDC staff and RSMC members have participated in the deliberations of many CBP Committees and Work Groups dealing with urban stormwater, land development, watershed planning, land use development, modeling and local government's role in the Bay Program.

During the last year, staff has followed the EPA's development of the Chesapeake Bay TMDL by attending regularly scheduled webinars and conference calls of the urban stormwater workgroup. Staff also participated in Virginia's efforts to create its Watershed Implementation Plan for the Chesapeake Bay through attending the Stakeholder Advisory Group meetings and the stormwater workgroup meetings from December 2009 through August 2010.

Chesapeake Bay Preservation Act Program

Fourteen of the sixteen member localities, including the six cities with Phase I MS4 Permits and the six localities with Phase II MS4 Permits, continue to implement programs in response to the Virginia Chesapeake Bay Preservation Act. Stormwater management is one component of those programs. Although the CBPA is not formally part of the multi-state Chesapeake Bay Program, described above, it serves as one element of local government implementation actions to comply with their MS4 Permits and to meet the goals of the Bay Program. Through the HRPDC Chesapeake Bay Committee, which also involves the region's non-permitted communities, staff members responsible for implementation of that program share information on successful program activities. These efforts are closely coordinated with the Regional Stormwater Management Committee. Routinely, the two Committees, meet jointly to address technical and regulatory issues of common concern.

Water Supply Planning

Beginning with the drought of 2002, the Department of Environmental Quality embarked on an intensive effort to develop regulations governing water supply planning and permitting. This effort was directed by legislation enacted by the Virginia General Assembly in 2003. Through the HRPDC Directors of Utilities Committee, the HRPDC and sixteen localities were heavily involved in these efforts. The HRPDC, as recommended by the Committee, adopted a formal position in support of the water supply planning regulations as finally proposed. These Regulations, governing local and regional water supply planning, became effective in late 2005. The region was also heavily involved in the effort beginning in FY 2003-2004 to develop modifications to the Virginia Water Protection Permit Regulations as they apply to water supply projects. Those regulations became final in early 2006.

Beginning in late Fall 2005, the HRPDC Directors of Utilities Committee began discussions on possible approaches to meeting the planning requirements in a cooperative, regional fashion. With a small grant from DEQ, the HRPDC staff and Utilities Committee have developed a framework for accomplishing development of a regional water supply and educational materials on the state planning requirements. Work continues on the regional water supply plan, with anticipated completion by 2011.

Water Quality Management Planning

Under the Clean Water Act, state legislation, water quality management planning regulations and a consent order involving the Commonwealth of Virginia and the federal government, the state is proceeding with development of a substantial number of TMDL (Total Maximum Daily Load) Studies and subsequent development of TMDL Implementation Plans. This work follows from the classification of the waters by the state as meeting or failing to meet water quality standards. Water bodies that fail to meet water quality standards are classified as "impaired," triggering the requirement to prepare the TMDL study. Once a TMDL Study is completed, state law requires the

development of an Implementation Plan, which will restore water quality in the water body to a level that meets water quality standards.

The HRPDC staff has coordinated regional involvement in the “impaired waters” listing process. This has entailed providing opportunities through the Joint Environmental Committee for education of local government staff on the TMDL process, development of technical comments on the “impaired waters” list and response to the development of TMDLs themselves.

The HRPDC staff is currently working with the region’s localities in participating in TMDL studies. To assist the region’s localities in addressing this requirement and ensuring that Implementation Plans are consistent with the ability of the localities to implement the recommendations, the HRPDC staff is working with DEQ to devise a cooperative regional partnership to coordinate the TMDL study process with the localities and to develop the required Implementation Plans. This initiative became increasingly important during FY 2009-2010, as TMDLs will have significant impacts on stormwater permits.

Staff worked with DEQ to facilitate local government involvement in the development of seven TMDL studies throughout Hampton Roads. Implementation Plans for bacterial TMDLs for the Back Bay and North Landing watersheds in Virginia Beach were finalized in August 2009. Draft Implementation Plans for bacterial TMDLs for the Upper Nansemond River Watershed in Suffolk and Mill and Powhatan Creek Watershed in James City County were developed in May 2010.

Sanitary Sewer Overflows

In late 2004, the HRPDC staff began implementing an electronic reporting and record keeping system known as the Sanitary Sewer Overflow Reporting System (SSORS). This system is considered to be a model and HRPDC staff has provided informational briefings and presentations on this system to a variety of agencies across the state. SSORS enables localities to communicate information about sanitary sewer overflows across departmental lines, allowing for easier reporting. SSORS was the basis for the creation of PARS

Work continues under the Regional Special Order by Consent with DEQ, thirteen local governments, HRSD and HRPDC. The Order established the framework for sewer system evaluation, flow monitoring, determination of allowable levels of infiltration/inflow, system modeling, and the appropriate balance between system and treatment capacity and collection systems.

As a part of this effort, the regional fats, oils and grease abatement program (HR FOG) was invigorated. A variety of materials for restaurants and residents has been developed to inform the public of proper FOG disposal methods. This is relevant to the stormwater program because of the potential for illicit discharges into the stormwater system.

CONCLUSION

Through the Hampton Roads Planning District Commission, the sixteen localities of Hampton Roads have established a comprehensive Regional Stormwater Management Program. This program provides technical assistance, coordination, comprehensive technical studies and policy analyses and stormwater education, supporting both permitted and non-permitted localities alike. The Regional Stormwater Management Program enables the region's localities to participate actively and effectively in state and federal regulatory matters. It has enhanced the ability of the twelve localities with VPDES Permits for their Municipal Separate Storm Sewer Systems to comply with permit requirements. Their long history of participating in the Regional Stormwater Management Program, enhanced the efforts by the localities that obtained Phase II MS4 Permits in 2003 to move forward cooperatively with permit applications and program development. In fact, their participation in the regional program over the past decade led to the establishment of the cooperative Phase II Permit component of the regional program.

Since the HRPDC staff also coordinates a number of other regional environmental initiatives, the program allows for effective coordination and regional balancing of the various activities. This characteristic of the regional programs facilitated efforts, beginning in FY 2002-2003, by representatives of the RSMC, Directors of Utilities and Hampton Roads Chesapeake Bay Committees and the regional wastewater and solid waste management agencies to address a number of environmental funding and regulatory issues of common interest. On several occasions over the last several years, the HRPDC formally endorsed recommendations developed through this coordinated initiative on state water quality and technology standards, funding guidelines, implementation strategies, as well as on state legislation addressing funding needs for water quality improvement programs.

The Regional Stormwater Management Program provides a mechanism through which the strengths of the sixteen local stormwater programs can be mutually supportive. It allows for cost-effective compliance with permit requirements, resolution of citizen concerns with stormwater drainage and water quality matters, and achievement of improved environmental quality throughout the Hampton Roads Region.

Exhibit B

James River and York River Basins Urban Runoff Allocations and Percent Reduction

Constituent	James River Basin (Edge of Stream)				York River Basin (Edge of Stream)			
	2010 No Action	EPA Backstop Allocation	Percent Reduction	Percent Urban Land Area	2010 No Action	EPA Backstop Allocation	Percent Reduction	Percent Urban Land Area
Total Nitrogen	4,157,021	2,329,792	44.0%	67.6%	728,248	410,554	43.6%	67.1%
Total Phosphorus	866,239	394,401	54.5%	68.5%	141,304	57,879	59.0%	74.2%
Total Suspended Solids	123,376	47,048	61.9%	66.8%	23,167	6,194	73.3%	79.1%

Note: (1) EPA predicts that if E3 was applied to 100% of urban areas, the percent reductions for TN, TP and TSS would average about 65%, 80% and 93%, respectively, for the York River and James River Basins. The percent urban land area served by BMPs is based on dividing the EPA Backstop Allocation percent reduction by the E3 percent reduction. For example, the Percent Urban Land Area for James TP = $54.5\% / 80\% = 68.5\%$, which means 68.5% of the urban land area would require a BMP to reach the 54.5% percent reduction necessary to meet the WLA (assuming there was no urban nutrient management).

Exhibit C

Estimated Capital Costs, Average Stormwater Bills and Statistics for Hampton Roads Communities

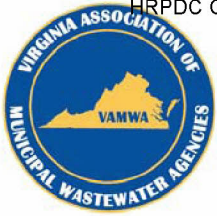
Category	Row	Item	TMDL 50% Retrofit Assumption on Regulated Stormwater		Reductions to Meet TMDL WLA
			Scenario 1a: All BMPs (\$/yr)	Scenario 2a: Fewer BMPs & Storage (\$/yr)	Scenario 2b: ⁽¹⁾ Fewer BMPs & Storage (\$/yr)
Estimated Costs	A	Estimated Capital Cost (Millions)	\$3,772	\$6,235	\$9,792
	B	Estimated Annual Cost (Millions per year)	\$405	\$669	\$1,050
Estimated Average Annual Stormwater Bills	C	Residential House (\$/yr)	\$510	\$850	\$1,300
	D	Convenience Store/ Gas Station (\$/yr)	\$4,600	\$7,500	\$12,800
	E	Neighborhood Shopping Center (\$/yr)	\$30,800	\$50,000	\$85,500
	F	Church (\$/yr)	\$10,300	\$16,700	\$28,500
	G	Regional Mall (\$/yr)	\$465,000	\$756,000	\$1,292,000
Census Households & Population	H	2009 Household Estimate	630,776	630,776	630,776
	I	2009 Population Estimate	1,641,298	1,641,298	1,641,298
	J	Total Annual Fee Per Household ⁽²⁾ (\$/yr) (Row "B" / Row "H")	\$640	\$1,060	\$1,670
	K	Total Annual Fee Per Person ⁽²⁾ (\$/yr) (Row "B" / Row "I")	\$250	\$410	\$640
Financial Burden	L	2009 Medium Household Income Estimate	\$55,404	\$55,404	\$55,404
	M	Residential House Stormwater Fee as Percentage of MHI (Row "C" / Row "L")	0.9%	1.5%	2.3%
	N	Total Household Stormwater Fee ⁽²⁾ as Percentage of MHI (Row "J" / Row "L")	1.2%	1.9%	3.0%

Note: (1) Does not include performance of urban nutrient management
 (2) Simulates stormwater costs passed on to consumer by retail stores, gas stations, etc.

Exhibit D

Summary of Impervious Area

Locality	EPA Total Land (acres)	EPA Impervious Land (acres)	Local Estimate Impervious Land (acres)	Percent difference from EPA to Local Impervious Estimate
Hampton	32,552	6,625	10,198	54%
Newport News	42,903	8,624	10,926	27%
Isle of Wight	100,747	1,318	1,360	3%
James City	90,603	3,039	7,028	131%
York	66,981	3,392	4,022	19%
Poquoson	9,238	430	663	54%
Suffolk	100,572	3,758	5,307	41%
Williamsburg	5,496	625	985	58%



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LEGAL COUNSEL

Christopher D. Pomeroy, Esq.
President, AquaLaw PLC

August 16, 2010

By Email & U.S. Mail

Robert Koroncai
U.S. Environmental Protection Agency
1650 Arch Street
Philadelphia, PA 19103

Re: James River Site-Specific Chlorophyll-*a* Criteria

Dear Mr. Koroncai:

Following up on our conversation at the recent EPA Region III Municipal Water Quality Meeting in Washington, D.C., I am writing to provide the attached summary of VAMWA's perspectives and recommendations on the James River Site-Specific Numeric Chlorophyll-*a* Criteria and associated wasteload allocations.

A core recommendation is that the Chesapeake Bay and/or James River TMDL process accommodate a review and appropriate revision of these unique criteria to improve the currently weak linkage between the criteria and designated use attainment. As you know, aside from the higher D.C. criteria, the Virginia/James River criteria are the only numeric chlorophyll-*a* criteria for Bay tidal waters, and these were adopted essentially on a first-ever or experimental basis in 2005 despite significant remaining scientific questions. Furthermore, significant new information is available at this time that is not reflected in the existing criteria.

The attached information, which was prepared by VAMWA's technical team, demonstrates the requested review and update is both a practical and necessary step prior to TMDL-based additional regulation beyond the Tributary Strategy level.

Sincerely,

Christopher D. Pomeroy
General Counsel

Enclosure

Copy to:

Mr. Alan Pollock, DEQ
VAMWA Board

CHLOROPHYLL-A STANDARDS & IMPLEMENTATION

AUGUST 16, 2010

VAMWA has been active on the chlorophyll-*a* topic since USEPA's initial efforts to derive Baywide criteria in 2000. Over this time, VAMWA representatives have served on technical committees, contributed independent data analyses, and provided numerous sets of technical comments on chlorophyll-*a*. In the interest of being concise, the main body of this letter summarizes and references much of this previous work. The summary is organized into the following categories:

- I. A brief history of the James River chlorophyll-*a* criteria
- II. Opportunities to improve the chlorophyll-*a* criteria
- III. Perspectives on the current TMDL process and draft wasteload allocations
- IV. Summary of recommendations

I. A BRIEF HISTORY OF THE JAMES RIVER CHLOROPHYLL-A CRITERIA

The technical work underlying the existing James River chlorophyll-*a* standards dates to various USEPA and DEQ efforts in the 2000-2005 timeframe. Following is a summary of these efforts, which is included to provide the necessary perspective on the situation Virginia faces today.

A. 2000-2003—USEPA-Led Efforts

Upon the adoption of the Chesapeake 2000 agreement June 2000, USEPA announced its intention to refine or derive Baywide criteria for dissolved oxygen (DO), water clarity, and chlorophyll-*a*, and formed scientific task groups for each criterion. Representatives from VAMWA served on all three task groups. The subsequent technical work over 2000-2003 revealed that, while all three criteria were technically challenging, the chlorophyll-*a* criterion was by far the most difficult to relate to designated use attainment in a manner that was not simply redundant of DO and water clarity criteria.

The first draft of the document (July 2001) emphasized the "Phytoplankton Reference Community Approach" along with other secondary sources of information such as historical values, literature values, and contributions to light attenuation and low DO. After the first review period, it was recognized that these lines of evidence lacked sufficient linkages between chlorophyll-*a* and designated uses (VAMWA & MAMWA, 2001).

A second draft (May 2002) emphasized "food quality" connections and mesoplankton abundance. VAMWA supported exploration of this approach, and contributed independent data analyses. However, rigorous reviews of this approach revealed that chlorophyll-*a* was not a useful indicator of adverse impacts to food quality or mesoplankton abundance (VAMWA & MAMWA, 2002). The draft criteria document received an adverse review by the Scientific and Technical Advisory Committee (STAC, 2002), and the "food quality" discussion was removed as a primary line of evidence. Similarly, linkages of chlorophyll-*a* to harmful algal blooms (HABs) were attempted, but there was insufficient data/information at that time to derive widely-applicable criteria (VAMWA & MAMWA, 2003).

Ultimately, USEPA recognized these deficiencies and made the correct decision not to publish Baywide chlorophyll-*a* criteria as part of the 2003 criteria document (USEPA, 2003). What *was* published represented a compilation of the multiple lines of inquiry from the 2000-2002 timeframe, a related table with a wide range of chlorophyll-*a* values, and an encouragement for states to use this information in developing site-specific chlorophyll-*a* where needed. In our review of this document (VAMWA & MAMWA, 2003), VAMWA expressed concern that the technical problems of using these values as criteria might not be fully recognized by the document's intended audience, and recommended specific language to prevent this outcome.

B. 2003-2005—Derivation of James River Chlorophyll-*a* Criteria

Due to the James River's relatively healthy DO levels, lack of significant influence on mainstem Bay DO, and solids-dominated clarity issues, it was recognized that neither DO nor water clarity criteria were likely to justify stringent nutrient controls in the James River estuary. In 2003, the Virginia DEQ initiated a rulemaking to make chlorophyll-*a* criteria the primary driver of nutrient controls in the James River.

In attempting to derive James River chlorophyll-*a* criteria in 2003-2004, the Virginia DEQ relied on the limited information available at the time. The technical basis for the criteria published in November 2004 relied on heavily on lines of support drawn from the USEPA's 2003 criteria document. The technical support document (Virginia DEQ, 2004) emphasized concerns over high chlorophyll-*a* and cyanophyte levels in the tidal fresh segments, and trends in potential bloom-forming phytoplankton taxa in the lower estuary. The proposed chlorophyll-*a* values represented a professional judgment of seasonal mean conditions representing a balanced phytoplankton population, and were also influenced by expectations of attainability under expected nutrient control scenarios.

VAMWA was highly involved at all stages of the public participation process for the James River chlorophyll-*a* criteria. Due to our familiarity with the scientific shortcomings of the 2001-2003 efforts, we initially recommended that Virginia adopt an adaptive management approach that used monitoring and research to strengthen the understanding of relations between chlorophyll-*a* and harmful algal blooms (VAMWA, 2004). When this course was not followed, we commented extensively on the subsequent criteria proposals (VAMWA 2005a, 2005b). In general, we concluded that the proposed criteria were highly subjective, lacked scientific linkages to unfavorable algal/ecological conditions, were strongly influenced by a pre-determined load allocations, and could result in huge expenditures with few tangible benefits. Our comments were supported by independent literature reviews and data analysis.

In 2005, the Virginia DEQ (with USEPA's assistance) performed the *James River Alternatives Analysis* (DEQ, 2005) in response to stakeholder concerns over the subjectivity, cost, and attainability of the proposed criteria. The purpose of this modeling analysis was to determine if "different cap load allocations could achieve equivalent environmental benefits with much lower economic impacts". The results were used not only to adjust the cap allocations, but also to adjust the proposed chlorophyll-*a* criteria in certain segment seasons. Hence, the criteria adopted in 2005 were inherently linked to expectations of attainment under a specific management scenario and the Phase 4.3 modeling framework.

C. 2008-2010—New Model, Different Answer

Under the present Phase 5 modeling framework used for the 2010 TMDL, the James River chlorophyll-*a* criteria are no longer predicted to be attainable at the previously-established loading level. This has put Virginia in the situation of possibly incurring an *additional* \$1.5 to 2.0 billion in nutrient implementation costs to meet a scientifically problematic, first-of-its-kind standard that was itself partially based on the assurance of attainability under a different modeling framework.

Section III of this letter summarizes VAWMA's serious concerns with the 2008-2010 TMDL allocation process for the James River. However, we would first like to take the opportunity (in section II) to explain why we believe that the James River chlorophyll-*a* standards can be markedly improved from a scientific and ecological basis, relying on data and research not available in 2000-2005.

II. OPPORTUNITIES TO IMPROVE THE CHLOROPHYLL-A STANDARD & MODELING FRAMEWORK

In VAMWA's view, several important new sources of information and data provide the opportunity to reevaluate and improve the basis of nutrient controls in the James River basin. These include academic research, USEPA research, and DATAFLOW monitoring results for the both the upper and lower James River. It would be premature to proscribe the specific methods or results of such as reevaluation. However, in the interest of showing the real promise of such an effort, we present here some specific examples of how linkages could be improved.

In VAMWA's view, modest year-to-year variations in the seasonal mean chlorophyll-*a* probably have very little to with aquatic life use attainment. One potential basis for improved an improved nutrient control framework would be linkages between chlorophyll-*a*, harmful algal blooms (HABs), and/or HAB toxins. Potential HAB taxa occur in both the low salinity and high salinity segments of the James River estuary. Although research available in 2003-2005 began to make some of these linkages, we believe that data and research since 2005 provide the opportunity to greatly improve the James River chlorophyll-*a* criteria.

A. Low Salinity Segments

In the 2004-2005 timeframe, VAMWA advocated the exploration of chlorophyll-*a* criteria in low salinity segments based on segment-specific empirical relations with potential HAB taxa such as *Microcystis aeruginosa*, which is a common inhabitant of the tidal freshwater James River. Certain strains of *M. aeruginosa* produce a toxin called microcystin that can be harmful to humans and aquatic life (Lampert, 1981; Fulton and Paerl, 1987; Fulton and Paerl, 1988), and *M. aeruginosa* has been known to cause nuisance blooms in other systems such as the Potomac River. It is not known if the James River strains are toxin-producing, and in general the James River does not experience the types of nuisance bloom conditions that have sometimes occurred on the Potomac River. However, previous work by VAMWA has explored the relations between chlorophyll-*a*, total cyanophytes, *M. aeruginosa*, and mesozooplankton abundance. Relatively strong empirical relations were evident.

Two years after the adoption of the James River chlorophyll-*a* criteria the USEPA published the *2007 Chlorophyll Criteria Addendum* (USEPA, 2007). This document provided the basis for chlorophyll-*a* criteria based on linkages with *M. aeruginosa*. VAMWA considered portions of this document as a step forward in linking chlorophyll-*a* criteria to designated use attainment. A strength of USEPA's approach was the joint consideration of the chlorophyll-*a*, *M. aeruginosa* cell count, and microcystin concentration.

We believe this approach merits consideration for application to the tidal freshwater James River. Relations between chlorophyll-*a* and *M. aeruginosa* can vary widely between segments, and so it would be recommended to closely explore the James-specific relations. The *2007 Chlorophyll Criteria Addendum* relied heavily on data from the Potomac River and upper Chesapeake Bay tributaries, and derived a threshold chlorophyll-*a* concentration of 27.5 ug/L. In contrast, the appropriate threshold for the James River is probably in the 36-40 ug/L range (Figure 1). It is also recommended to conduct monitoring to determine whether the James River strains of *M. aeruginosa* produce microcystin, and if so, at what concentrations.

It is not known if a HAB-based criterion for the low salinity segments of the James River would be more or less stringent than the existing criteria. The criteria magnitude would likely rise, but changes in the frequency/duration components could cause the criterion to become more stringent. In addition, it must be considered that cyanophytes such as *M. aeruginosa* are natural components of the phytoplankton assemblage in this segment, and thus attainability should also factor in to the overall assessment. Attainability is especially important to consider for the region near the confluence of the James River with the Appomattox River, where river morphology and hydraulics cause a natural chlorophyll-*a* peak. Nevertheless, VAMWA strongly recommends consideration of the HAB-related lines of evidence, among other potential approaches for refining the James River nutrient control framework.

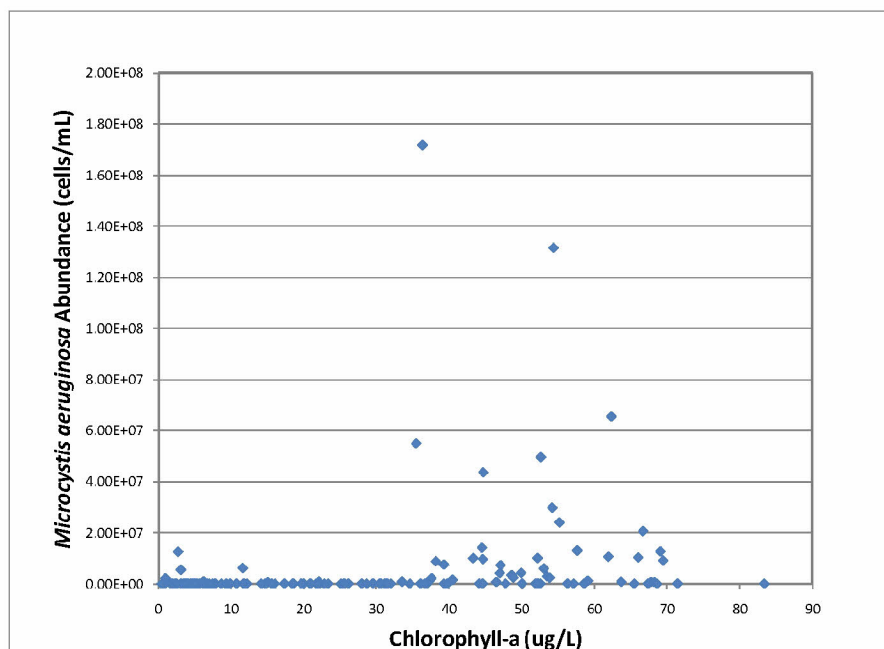


Figure 1—Scatterplot of *M. aeruginosa* abundance versus chlorophyll-*a* at station TF5.5 in the James River estuary, 1986—2006. Data courtesy of R. Lacouture.

B. Higher Salinity Segments (Lower James River)

As in the upper estuary, HAB linkages merit exploration as one potential basis for revision of the nutrient control framework in the lower James River estuary. During the final comment period on the standards, VAMWA recommended an anti-degradation and adaptive management approach be taken on the lower James River as a precaution against HABs. This recommendation reflected our belief that the HAB related end-point probably offered the best approach to developing a defensible standard among the many others that were considered. Addressing HABs is important because they can result in direct effects on designated uses such as fish, oysters, user perceptions, etc.

There is now considerably more data and information available to make connection between chlorophyll-*a* and HABs than was previously available. HRSD began weekly water quality monitoring in the lower James River in 2005 that is presently on-going. The main objective of the program is to collect data sufficient to assess the chlorophyll and water clarity standards according the EPA guidance (EPA 2003) for monitoring bay related standards. HRSD, VADEQ, and VIMS collectively established procedures to ensure quality control and incorporate the data in the regulatory assessments of the standards. The monitoring program utilizes the DATAFLOW system developed by VIMS for the purposes of chlorophyll *a* and water clarity criteria assessment (Moore and others 2003). Since its inception there have been over 350 cruise dates successfully conducted in the Hampton Roads. As a result, over 1.2 million chlorophyll-*a* and related water quality observations are available. This information along with

continuous monitoring site data collected by VIMS is made publically available through the Virginia Estuarine and Coastal Observing System (VECOS) (<http://www2.vims.edu/vecos/>). This information would be valuable to a standards revision because it serves to assess the dynamics of algal blooms with a high level of spatial and temporal resolution.

During 2008 Old Dominion University (ODU) began using VECOS data to expand its research into the environmental triggers and dynamics of HABs in the Hampton Roads. The products of this research resulted in a number of scientific papers related to *Cochlodinium polykrikoides* blooms (Mulholland and others, 2009; Morse and others, 2009; and Morse and others, 2010). These studies indicated that *Cochlodinium polykrikoides* blooms in 2007 and 2008 coincided with periods of intense summer rains and storm water runoff following droughts. Initiation of algal blooms was also found to be correlated with neap tides, vertical stratification of the water column, and low wind conditions. Similar patterns have been observed in 2009 and 2010 since the scientific papers were written. Another major finding was that the Lafayette and Elizabeth Rivers appear to act as an initiation grounds for *Cochlodinium polykrikoides* blooms. Through use of the VIMS model the authors demonstrated that the bloom organism was transported from the Lafayette and Elizabeth Rivers into the lower James River where it later became fully established.

The above research results are directly applicable to chlorophyll management of the James River. We believe that key elements to reducing chlorophyll a levels in the James River in the future should include (a) greater measures to reduce nutrient pulses due to storm water inputs and (b) placing more attention to the inter-connected nature of the Lafayette and Elizabeth River systems with respect to James. The present TMDL and associated modeling does not capture these key elements and smaller scale effects.

Based on the greater information now available, the following specific concepts should be considered among other opportunities for revision of the nutrient control framework for the lower James River.

1. Nutrient control framework revision

- Revise the standard to address *Cochlodinium polykrikoides* blooms as the indicator HAB. Although other HAB phytoplankton species are also of concern (particularly toxin formers), *Cochlodinium polykrikoides* appears to be the best studied, obvious, and problematic for Hampton Roads. Annual summer blooms of this species have become a predictable and routine occurrence. Blooms of this species are primarily responsible for the non-attainment status of the existing chlorophyll standard during the summer. Because of the extreme influence of bloom events on ambient chlorophyll conditions it is essential that the standard and modeling system be revised to effectively address them. Note: *Heterocapsa triquetra* appears to be responsible for algal blooms in the JMSMH segment during the spring season and should be considered during a standards revision as well for the spring season. However, the data related to this species is presently more limited.
- Refine relationships between algal cell counts and impacts on designated uses. Some data is presently available in the literature but additional studies are needed to determine cause and effect relationships between cell counts and various biological end-points for the specific area.

- Refine relationships between algal cell counts and chlorophyll-*a*. Recent data (Figure 2) indicates a regression relationship exists between *Cochlodinium polykrikoides* cell counts and chlorophyll *a*. A continued refinement of this relationship could provide a direct connection between chlorophyll *a* concentration and impairment of designated uses (i.e. through the relationship with cell counts).
- Determine acceptable limits on the size and duration of algal blooms. Isolated bloom patches and/or those which are short-lived may not cause significant ecological damage in a large system such as the James. However, when these blooms become expansive and/or long-lived the environmental consequences can be more serious. Part of the proposed standard revision should consider establishing appropriate limits at these scales. Once established these limits could become the basis for biological reference curves needed for criteria assessment. The existing chlorophyll standards utilize a default 10% reference curve that is unrelated to designated use impairment.

2. Chlorophyll-*a* modeling improvements

Our recent comments on the chlorophyll-*a* modeling indicated concerns about the reliability of the results relative to the precision with which they were expressed. To address those concerns we recommend that the chlorophyll-*a* modeling be significantly improved. It is essential that the TMDL model reasonably simulate bloom dynamics and the controlling processes at scales upon which they occur. However, the existing model was designed to simulate long term averages in chlorophyll and estimate the effects of nutrient reduction on chlorophyll-*a* as step trends. Such a simplistic modeling approach cannot assess the effects of nutrient reduction on short-term bloom events, which represent the true environmental problem – and the present cause for standards non-attainment. As a result, we have very little confidence that the James River will actually respond to nutrient reduction in the manner in which it is now projected. High density chlorophyll-*a* data that is now available in the lower James River would greatly assist in the development and calibration of models relative to such bloom events.

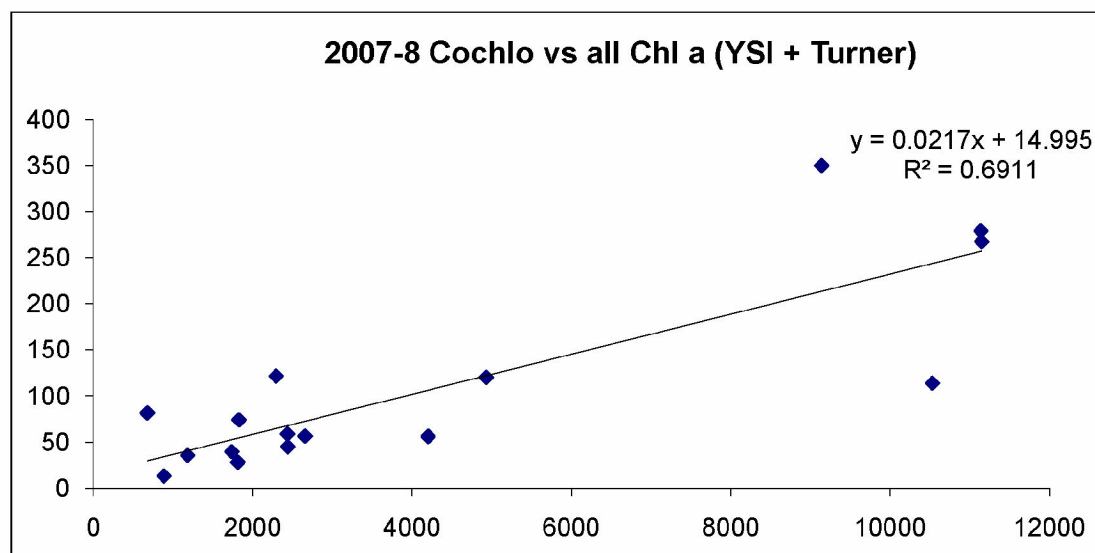


Figure 2—Relationship between *Cochlodinium* cell counts (x-axis- #/ml) vs chlorophyll a (ug/l). Figure and data provided courtesy of Ryan Morse, Old Dominion University.

In addition, we support EPA's efforts to consider the role of Atlantic menhaden in relation to management of chlorophyll-*a*. Recent modeling work has shown that their migration into the tributaries and associated consumption of algae has the potential to affect chlorophyll-*a* and associated compliance with the standards. Although present menhaden stocks do not appear to dramatically reduce chlorophyll-*a* (as long term averages) incremental effects due to increasing the size of the stock are considered comparable to nutrient reduction. We recommend that additional analyses be conducted to evaluate the effect of increasing menhaden stocks on seasonal peaks and/or worst years in the record. Further, additional modeling enhancements should be made such that the menhaden migration and residence time varies according to a food gradient. A number of papers indicate that menhaden consumption of algae increases in areas with higher chlorophyll-*a*. This is logical since the species would remain longer in an area with greater availability of food. Because the model does not presently capture these foraging effects the available reductions in chlorophyll due to menhaden (especially during bloom conditions) could be under-estimated.

In summary, effective management of the nutrient control framework in the lower James River requires a revision of both the standard and modeling framework.

III. PERSPECTIVES ON THE CURRENT TMDL PROCESS AND DRAFT WASTELOAD ALLOCATIONS

The outcome of the 2008-2010 TMDL process resulted in large (15-30%) reductions in the James River basin's nutrient allocations, estimated to cost an additional \$1.5 to 2.0 billion in capital implementation costs above the already-costly tributary strategy level of effort (VAMWA, 2010a). In VAMWA's view, these large cuts and increased expenditures are unjustified both on technical and policy grounds. Major

problems include: (1) the failure to resolve problems with the James River chlorophyll-*a* criteria; (2) a problematic, non-transparent modeling framework; and (3) lack of water quality benefits. These problems were discussed in a prior technical memo (VAMWA 2010b—Attachment A) and summarized below.

A. Failure to Resolve Problems with James River Chlorophyll-*a* Criteria

As outlined in section I of this letter, the James River chlorophyll-*a* criteria represented a difficult, highly subjective, first-of-its kind regulation. Linkages to ecology are weak at best, and the criterion was directly based (in part) on model predictions of attainability. It is unacceptable that criteria and allocations should be based on one model prediction, and then huge allocation cuts promoted based on another modeling framework, without revisiting the criterion itself. Such an approach would ignore the history and uncertain nature of the standard. More importantly, it would fail to take advantage of the opportunity to improve the scientific/ecological basis of the standard.

B. Problematic, Non-Transparent Modeling Framework

Since December 2009, VAMWA has raised questions on the James River chlorophyll-*a* modeling calibration and utility (Bell, elec. comm., 4 Jan. 2010). These include

- Obviously erroneous calibration in certain segment-seasons (JMSTFL, JMSPH).
- Model post-processing problems as evidenced by problematic regressions used to scenario-transform the data.
- Unexplained model anomalies
- High leverage of few data in the data transformation process (e.g., September 1999 data at LE5.2).

Although these issues have been recognized for certain segment-seasons in which there were most obvious, we see no indication that the CBP has performed a more systematic review of the same issues in all segment-seasons, determined the causes/extent of model anomalies, or fully evaluated the predictive capabilities of the model. We see no evidence that USEPA has performed a systematic examination of whether the model correctly predicts the magnitude and direction of inter-annual changes in chlorophyll-*a*, nor an examination of whether the same problems that cause counterintuitive results in some segment-seasons might also be more causing more systematic, less obvious problems in other segment-seasons.

Under the current approach, management decisions are highly susceptible to the criticism that CBP has been highly selective and partially arbitrary regarding which model predictions are usable and which are not. We have recommended that the CBP develop a set of objective criteria for evaluating model behavior that includes: (1) a systematic evaluation of the ability of the model to quantify changes in chlorophyll-*a*; and (2) an evaluation of the causes of problem model chlorophyll-*a* predictions, and how those causes might affect the model accuracy/precision on a model global level (VAMWA, 2010b—Attachment A)

B. Lack of Water Quality Benefits

USEPA justification for going beyond the 190/13 allocation level appears to be 2-3% reductions in non-attainment in selected segment seasons, corresponding to 1-2 ug/L reduction in chlorophyll-*a* in selected segment seasons (VAMWA, 2010b—Attachment A). It is a misapplication of the model framework to claim that it is capable of distinguishing between model scenarios at these levels, or that huge implementation/cost escalations should be made based on these tiny predicted shifts.

If the model cannot distinguish between D.O. non-attainment rates of 0% and 1% (as acknowledged by USEPA), the spread in distinguishable non-attainment rates for chlorophyll-*a* can be expected to be greater. VAMWA has performed analyses to demonstrate that the tiny predicted shifts in chlorophyll-*a* are smaller than the field/laboratory error and smaller than could be detected in long-term monitoring data (VAMWA, 2010b—Attachment A). The post-processing regression equations for the key scenarios in question might not even be significantly different. Although VAMWA does not have yet access to the regression data, it appears likely that statistical hypothesis testing would indicate that the parameters of these regressions might not even be statistically distinguishable. Given the strong implicit margin of safety of the Bay TMDL, VAMWA believes it is acceptable to base allocations on “essentially equivalent” model scenarios, with the choice of scenario informed by a strong understanding of the precision of the underlying criteria, model predictions, monitoring capabilities, and cost-benefits.

IV. SUMMARY OF RECOMMENDATIONS

Based on the technical comments and perspectives present in this letter, VAMWA’s recommendations are as follows:

A. Set the James River basin’s 2010 TMDL allocations at tributary strategy levels.

B. In the TMDL/WIP process, include opportunity for a comprehensive reevaluation of the James River chlorophyll-*a* criteria and modeling framework, to be completed by 2017. This time period also provides an excellent opportunity to assess the influence of tributary strategy implementation progress on the dynamics of existing algal blooms on the James River. A number of point source projects are scheduled to be completed by January 2011. Continued application of the DATAFLOW program over time offers a means to assess and quantify changes in HABs and chlorophyll levels relative to implemented nutrient controls during this time period.

C. Review the James River TMDL allocations in 2017 based on the outcome of the criteria review.

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ATTACHMENT A

June 30, 2010 Review of USEPA James River Chlorophyll-*a* Recommendations and Supporting Materials.



Technical Memorandum

Date: June 30, 2010

To: Virginia Association of Municipal Wastewater Agencies

From: Clifton F. Bell, Malcolm Pirnie, Inc.
Will Hunley, Hampton Roads Sanitation District

Re: Review of USEPA James River Chlorophyll-*a* Recommendations and Supporting Materials

The following technical comments are related to materials contained in the USEPA Chesapeake Bay Program's (CBP) presentation entitled "Achieving Attainment of the James Chlorophyll Water Quality Standard", dated June 18, 2010. In this presentation, EPA concludes that nutrient loadings of 23.5 TN/2.34 TP were estimated to achieve the James River chlorophyll-*a* standards. If these specified loadings were chosen as basin allocations they would result in a reduction of 4.6 TN/1.31 TP relative to the presently established tributary strategy loads of 28.1 TN/3.65 TP. However, the available technical information does not adequately support or justify nutrient reductions beyond the existing tributary strategy level for the following reasons:

- The James River chlorophyll-*a* modeling framework continues to have major technical problems including poor calibration and unexplained anomalies.
- The CBP has only partially recognized/addressed modeling problems, and has lacked clear criteria for evaluating the model accuracy, precision, and utility. The result has been a semi-arbitrary selection of which model results/data to use for load allocation or which model results to ignore.
- The predicted changes in chlorophyll-*a* (on the order of 1-2 ug/l seasonal average and 2-4% in terms of non-attainment rates) are smaller than those than can be precisely distinguished by the model, detected in monitoring data, or concluded to have ecological significance.
- Relatedly, the predicted response of chlorophyll-*a* to nutrient load reductions are extremely "flat" in key segment-seasons. Such a misapplication of the modeling framework could lead to huge expenditures without significant changes in standards attainment or result in tangible environmental improvement.

Specific comments are provided below:

1. *The James River chlorophyll-*a* modeling framework has major calibration/behavior problems that have only been partially recognized and addressed:* Since December 2009, VAMWA has raised questions on the James River chlorophyll-*a* modeling calibration and utility (Bell, elec. comm., 4 Jan. 2010). Although the CBP has not specifically responded to the VAMWA's request for a detailed examination of model calibration

problem, a review of the June 18, 2010 materials indicates that the CBP has recognized certain model calibration and post-processing issues, including the following:

- Obviously erroneous calibration in certain segment-seasons (JMSTFL, JMSPH).
- Model post-processing problems as evidenced by problematic regressions used to scenario-transform the data.
- Unexplained model anomalies
- High leverage of few data in the data transformation process (e.g., September 1999 data at LE5.2).

Although these issues have been recognized for certain segment-seasons in which there were most obvious, we see no indication that the CBP has performed a more systematic review of the same issues in all segment-seasons, determined the causes/extent of model anomalies, or fully evaluated the predictive capabilities of the model. The main criteria that CBP appears to have used to deem model results as acceptable for a given segment-season appear to be:

- Whether or not the model predicts the approximate range of chlorophyll-*a*, without a systematic examination of whether the model correctly predicts the magnitude and direction of interannual *changes* in chlorophyll-*a*.
- Whether or not the model predicts decreasing chlorophyll-*a* with decreasing nutrient loads, without an examination of whether the same problems that cause counterintuitive results in some segment-seasons might also be more causing more systematic, less obvious problems in other segment-seasons.

Under the current approach, management decisions are highly susceptible to the criticism that CBP has been highly selective and partially arbitrary regarding which model predictions are usable and which are not. It would be recommended that the CBP develop a set of objective criteria for evaluating model behavior that includes: (1) a systematic evaluation of the ability of the model to quantify changes in chlorophyll-*a*; and (2) an evaluation of the causes of problem model chlorophyll-*a* predictions, and how those causes might affect the model accuracy/precision on a model global level.

2. The predicted changes in chlorophyll-*a* are smaller than can be precisely quantified by the model. Based on a review of the June 18, 2010 materials, CBP's justification for going beyond the 190/13 allocation level appears to be very small decreases in chlorophyll-*a* and non-attainment rates:

- 2-3% reductions in non-attainment in selected segment seasons (JMSTFL, JMSPH)
- 1-2 ug/L reduction in chlorophyll-*a* in selected segment seasons. (see Attachment A)

It is a misapplication of the model framework to claim that it is capable of distinguishing between model scenarios at these levels, or that major management decisions should be

made based on these tiny predicted shifts. The precision of chlorophyll-*a* predictions can be expected to be significantly less than that for mainstem Bay dissolved oxygen (D.O.), which enjoys a much better calibration. If the model cannot distinguish between D.O. non-attainment rates of 0% and 1% (as acknowledged by CBP), the spread in distinguishable non-attainment rates for chlorophyll-*a* can be expected to be greater. Given the strong implicit margin of safety of the Bay TMDL, it cannot be concluded that model is precise enough to distinguish between scenarios that predict 0-1% nonattainment and 2-4% nonattainment.

The post-processing regression equations for the key scenarios in question might not even be significantly different. Examining the chart on the lower right of slide 12, it appears that the offset in regression equations for multiple scenarios is significantly less than the spread of data around the regression lines. (It is recommended to zoom in on the slide to visually examine the three scenario lines between the calibration and E3 scenarios). Although VAMWA did not have access to the regression data, it appears likely that statistical hypothesis testing would indicate that the parameters of these regressions are within each other's 95% confidence limits, and they are probably not even statistically distinguishable.

3. The predicted changes in chlorophyll-*a* are smaller than could be detected in monitoring data. It can be demonstrated that tiny predicted shifts in chlorophyll-*a* between the 190 scenario and the "between 170/Potomac" scenario would not even be detectable in light of environmental, sampling, and analytical variability. For example:

(a) Power analysis demonstrates that even after long (25 year) monitoring periods, the minimum significant difference (MSD) in seasonal mean chlorophyll-*a* would be in the 2-4 ug/L range for most attaining segment seasons (Attachment B). Thus, it appears that the modeled shift in chlorophyll-*a* between the 190 and the "between 170/Potomac" scenario would probably not be detectable in the monitoring data.

(b) Based on a review of laboratory split sample results for the 1991-2000 James River data obtained from the CBMP data hub, the median relative percent difference (RPD) in chlorophyll-*a* samples was about 16 percent, corresponding to 1-4 ug/L chlorophyll-*a*, depending on segment and season (Attachment C). Thus, analytical variability alone is equal to or greater than the modeled shifts in chlorophyll-*a* between the 190 scenario and the "between 170/Potomac" scenario. Consideration of field (sampling) variability would increase the total variance of chlorophyll-*a* measurements even further.

4. The predicted changes in chlorophyll-*a* are not ecologically significant. The difference in chlorophyll-*a* levels predicted between tributary strategy and the proposed reduced allocation scenarios (on the order of 1-2 ug/l seasonal average and 2-4% in terms of non-attainment rates) are exceptionally small in magnitude. This estimated level of change is too small to be seriously considered a matter of practical importance or consequence to Bay restoration. Even if the model could adequately discern such differences (which we dispute as discussed above) they would probably not result in tangible environmental

benefits. It should be remembered that the chlorophyll-*a* standard development process was acknowledged by VDEQ and stakeholders to be highly imprecise. Although its precision could not be quantified, revisions made to the criteria values on the basis of attainability were well within the differences described above. This shows that environmental conditions are essentially equivalent at the scale of a few micrograms.

VAMWA has consistently recommended that the James River chlorophyll-*a* standards eventually undergo reevaluation to take advantage of more recent monitoring data and research. It would be inappropriate to slash load allocations unless such a process clearly demonstrated the ecological need.

5. *The predicted response of chlorophyll-*a* to nutrient load reductions are extremely "flat" in key segment-seasons.* This means that very large reductions in nutrient loading would result in only very small incremental reductions in chlorophyll-*a* concentrations and/or reductions in non-attainment rate. For example the critical segments of the tidal freshwater and lower estuary are predicted to have response rates of approximately 0.4 and 0.2 ug/l chlorophyll response per Mlb/yr TN reduction. Such a misapplication of the modeling framework could lead to huge expenditures without significant changes in standards attainment or result in tangible environmental improvement.

In previous Bay TMDL comments HRSD estimated nutrient control capital costs at \$150M per mpy TN reduction. Clearly, such a misapplication of the modeling framework could lead to huge expenditures without significant changes in standards attainment or result in tangible environmental improvement.

CONCLUSIONS

Although we recognize the tight schedule for the Baywide TMDL, we do not believe it is the best interests of Virginia or the environment to make large cuts to allocations on the basis of near non-detectable shifts in chlorophyll-*a* predicted by a problematic, imprecise model. It is recommended that TMDL allocations for the James River be based on the 191/14.4 (Tributary Strategy) scenario, and that Virginia initiate a longer-term process for reevaluating and refining the modeling framework, chlorophyll-*a* standards, and load allocations as necessary.

ATTACHMENT A
Estimation of the Magnitude of Model-Predicted Changes in Chlorophyll-*a*

This attachment describes how the CBP presentation entitled “Achieving Attainment of the James Chlorophyll Water Quality Standard” (dated June 18, 2010) was used to interpret the magnitude of predicted changes in seasonal average chlorophyll-*a* between the 190/12.7 scenario and the “between 170/Potomac” scenario. VAMWA did not have access direct access to model output or post-processing regression equations for most segments and months. Therefore, the approximate magnitude of the shift was estimated by examination of regression relationships for key segment-months:

- JMSTFL April 1995 (slide 6), taken as representative of JMSTF Spring
- JMSMH September 1999 (slide 12), taken as representative of JMSTF Summer

The offsets in predicted \ln_chl_a between regression lines for different scenarios were quantified as a function of decreases in the James River total nitrogen load. These demonstrated an approximately linear relation between \ln_chl_a and TN load, with the following approximate slopes:

- JMSTFL Spring: $5.72E-2$ reduction in \ln_chl_a for every 1 Mlb/yr TN reduction in the James River TN load.
- JMSMH Summer: $3.37E-2$ reduction in \ln_chl_a for every 1 Mlb/yr TN reduction in the James River TN load

The “between 170/Potomac” scenario represents a 3.1 Mlb/yr reduction in James River TN load, relative to the 190 scenario. This corresponds to the following predicted reductions in \ln_chl_a :

- JMSTFL Spring: 0.177 reduction in \ln_chl_a .
- JMSMH Summer: 0.104 reduction in \ln_chl_a

As these JMSTF-Spring and JMSMH-Summer approach attainment with the existing chlorophyll-*a* criteria, their seasonal average chlorophyll-*a* values will approach 15 ug/L and 10 ug/L, respectively. At these levels, the predicted reduction in \ln_chl_a listed above would correspond to the following reductions in chlorophyll-*a* concentration:

- JMSTFL Spring: ~2 ug/L reduction in chlorophyll-*a*
- JMSMH Summer: ~1 ug/L reduction in chlorophyll-*a*

ATTACHMENT B

Power Analysis of Seasonal Mean Chlorophyll-*a*

A two-sample power analysis was conducted to determine the minimum significant difference (MSD) in the seasonal mean chlorophyll-*a* concentrations that could be expected in the James River, Virginia. Values of α and β were set to conventional values of 0.05 and 0.2, respectively. The value of *n* was selected as 25, representing the approximate number of years for which a pre-TMDL seasonal mean could be calculated for most James River segments, and also representing a 25-year post-TMDL monitoring period.

In order to determine the standard deviation of the chlorophyll-*a* seasonal means, 1991-2000 monitoring data were obtained from the CBMP data hub. Seasonal means were calculated simple as the mean of all surface layer chlorophyll-*a* values by segment and season (spring & summer). These seasonal mean values were compared to water quality criteria. Standard deviations were calculated for segment-seasons for which the seasonal mean values were below the criteria (Table A.1). This represents a simplification of the full CFD-based assessment process, but was conducted to identify the approximate standard deviations of seasonal mean chlorophyll-*a* values in segment-seasons that are likely to be in attainment.

TABLE A.1—Standard Deviation of Seasonal Mean Chlorophyll-*a*, 1991-2000

Season	JMSMH	JMSOH	JMSPH	JMSTF1	JMSTF2
Spring	2.8	4.5	2.4	4.1	2.1
Summer	2.3	3.7	1.9	4.2	3.9

The power analysis was conducted using the software of Lenth (2010). Result (Table A.2) indicate that the MSD in seasonal mean chlorophyll-*a* is 2-4 ug/L for most attainment segment-seasons.

TABLE A.2—Minimum Significant Difference in Seasonal Mean Chlorophyll-*a*

Season	JMSMH	JMSOH	JMSPH	JMSTF1	JMSTF2
Spring	2.3	3.7	1.9	3.3	1.7
Summer	1.9	3.0	1.5	3.4	3.2

ATTACHMENT C
Relative Percent Difference of Chlorophyll-*a* Measurements

The relative percent difference (RPD) of chlorophyll-*a* lab splits were calculated from 1991-2000 James River data obtained from the CBMP data hub. An RPD was calculated for each sampling event for which chlorophyll-*a* data were reported for both “S1/LS1” and “S1/LS2” sample types. RPD was calculated using the following equation:

$$RPD = \left| \frac{x_1 - x_2}{(x_1 + x_2)/2} \right| \times 100$$

A total of 595 data pairs were available for the calculation. The mean RPD was 35%, but this value was strongly affected by outliers. The median RPD was 16%. There was no obvious graphical trend in RPD with chlorophyll-*a* magnitude.

cfb

Exhibit F
From Appendix M, Table M3 with
only post processing for James LOE at 1/2 Potomac

Cbsegs	Scenario→		'91-'00 Base Scenario 36.8TN, 4.3TP,							
	Year →		'91-'93	'92-'94	'93-'95	'94-'96	'95-'97	'96-'98	'97-'99	'98-'00
	State		CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal
JMSTFL	VA		0%	0%	6%	6%	19%	11%	30%	16%
JMSTFU	VA		0%	0%	0%	0%	0%	0%	0%	0%
JMSOH	VA		0%	0%	0%	9%	13%	16%	10%	13%
JMSMH	VA		30%	5%	0%	7%	13%	13%	8%	2%
JMSPH	VA		20%	5%	5%	22%	22%	22%	0%	0%
Cbsegs	State		CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal
JMSTFL	VA		35%	36%	20%	14%	2%	17%	22%	33%
JMSTFU	VA		22%	22%	17%	2%	16%	28%	28%	17%
JMSOH	VA		0%	0%	0%	0%	1%	1%	1%	0%
JMSMH	VA		0%	0%	0%	0%	4%	4%	26%	20%
JMSPH	VA		0%	0%	4%	6%	6%	0%	22%	33%

Cbsegs	Scenario→		Tributary Strategy 27.5TN, 3.3TP,							
	Year →		'91-'93	'92-'94	'93-'95	'94-'96	'95-'97	'96-'98	'97-'99	'98-'00
	State		CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal
JMSTFL	VA		0%	0%	5%	5%	5%	0%	7%	7%
JMSTFU	VA		0%	0%	0%	0%	0%	0%	0%	0%
JMSOH	VA		0%	0%	0%	7%	7%	7%	0%	6%
JMSMH	VA		4%	1%	0%	0%	0%	0%	0%	0%
JMSPH	VA		0%	0%	0%	0%	0%	0%	0%	0%
Cbsegs	State		CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal
JMSTFL	VA		0%	0%	0%	0%	7%	20%	20%	10%
JMSTFU	VA		0%	0%	0%	0%	0%	0%	0%	0%
JMSOH	VA		0%	0%	0%	0%	0%	0%	0%	0%
JMSMH	VA		0%	0%	0%	0%	0%	0%	16%	15%
JMSPH	VA		0%	0%	0%	0%	0%	0%	12%	12%

Cbsegs	Scenario→		190/12.7 Loading Scenario 26.6TN, 2.7TP,							
	Year →		'91-'93	'92-'94	'93-'95	'94-'96	'95-'97	'96-'98	'97-'99	'98-'00
	State		CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal
JMSTFL	VA		0%	0%	2%	2%	2%	0%	0%	0%
JMSTFU	VA		0%	0%	0%	0%	0%	0%	0%	0%
JMSOH	VA		0%	0%	0%	4%	4%	4%	0%	5%
JMSMH	VA		3%	1%	0%	0%	0%	0%	0%	0%
JMSPH	VA		0%	0%	0%	0%	0%	0%	0%	0%
Cbsegs	State		CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal
JMSTFL	VA		0%	0%	0%	0%	5%	15%	15%	8%
JMSTFU	VA		0%	0%	0%	0%	0%	0%	0%	0%
JMSOH	VA		0%	0%	0%	0%	0%	0%	0%	0%
JMSMH	VA		0%	0%	0%	0%	0%	0%	15%	14%
JMSPH	VA		0%	0%	0%	0%	0%	0%	11%	11%

Cbsegs	Scenario→		James L.O.E 1/2 Potomac 23.5N 2.35P							
	Year →		'91-'93	'92-'94	'93-'95	'94-'96	'95-'97	'96-'98	'97-'99	'98-'00
	State		CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal
JMSTFL	VA		0%	0%	0%	0%	0%	0%	0%	0%
JMSTFU	VA		0%	0%	0%	0%	0%	0%	0%	0%
JMSOH	VA		0%	0%	0%	0%	0%	0%	0%	0%
JMSMH	VA		1%	0%	0%	0%	0%	0%	0%	0%
JMSPH	VA		0%	0%	0%	0%	0%	0%	0%	0%
Cbsegs	State		CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal
JMSTFL	VA		0%	0%	0%	0%	2%	6%	6%	2%
JMSTFU	VA		0%	0%	0%	0%	0%	0%	0%	0%
JMSOH	VA		0%	0%	0%	0%	0%	0%	0%	0%
JMSMH	VA		0%	0%	0%	0%	0%	0%	1%	1%
JMSPH	VA		0%	0%	0%	0%	0%	0%	9%	9%

Exhibit G

Adjusted Values Based on EPA June 2010 Presentation

Cbsegs	Scenario→		'91-'00 Base Scenario 36.8TN, 4.3TP,							
	Year →		'91-'93	'92-'94	'93-'95	'94-'96	'95-'97	'96-'98	'97-'99	'98-'00
	State		CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal
JMSTFL	VA		0%	0%	6%	6%	19%	11%	30%	16%
JMSTFU	VA		0%	0%	0%	0%	0%	0%	0%	0%
JMSOH	VA		0%	0%	0%	9%	13%	16%	10%	13%
JMSMH	VA		30%	5%	0%	7%	13%	13%	8%	2%
JMSPH	VA		20%	5%	5%	22%	22%	22%	0%	0%
Cbsegs	State		CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal
JMSTFL	VA		35%	36%	20%	14%	2%	17%	22%	33%
JMSTFU	VA		22%	22%	17%	2%	16%	28%	28%	17%
JMSOH	VA		0%	0%	0%	0%	1%	1%	1%	0%
JMSMH	VA		0%	0%	0%	0%	4%	4%	26%	20%
JMSPH	VA		0%	0%	4%	6%	6%	0%	22%	33%

Cbsegs	Scenario→		Tributary Strategy 27.5TN, 3.3TP,							
	Year →		'91-'93	'92-'94	'93-'95	'94-'96	'95-'97	'96-'98	'97-'99	'98-'00
	State		CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal
JMSTFL	VA		0%	0%	5%	5%	5%	0%	7%	7%
JMSTFU	VA		0%	0%	0%	0%	0%	0%	0%	0%
JMSOH	VA		0%	0%	0%	7%	7%	7%	0%	6%
JMSMH	VA		4%	1%	0%	0%	0%	0%	0%	0%
JMSPH	VA		0%	0%	0%	0%	0%	0%	0%	0%
Cbsegs	State		CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal
JMSTFL	VA		0%	0%	0%	0%	7%	20%	20%	10%
JMSTFU	VA		0%	0%	0%	0%	0%	0%	0%	0%
JMSOH	VA		0%	0%	0%	0%	0%	0%	0%	0%
JMSMH	VA		0%	0%	0%	0%	0%	0%	5%	4%
JMSPH	VA		0%	0%	0%	0%	0%	0%	42%	42%

Cbsegs	Scenario→		190/12.7 Loading Scenario 26.6TN, 2.7TP,							
	Year →		'91-'93	'92-'94	'93-'95	'94-'96	'95-'97	'96-'98	'97-'99	'98-'00
	State		CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal
JMSTFL	VA		0%	0%	2%	2%	2%	0%	0%	0%
JMSTFU	VA		0%	0%	0%	0%	0%	0%	0%	0%
JMSOH	VA		0%	0%	0%	4%	4%	4%	0%	5%
JMSMH	VA		3%	1%	0%	0%	0%	0%	0%	0%
JMSPH	VA		0%	0%	0%	0%	0%	0%	0%	0%
Cbsegs	State		CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal
JMSTFL	VA		0%	0%	0%	0%	5%	45%	45%	8%
JMSTFU	VA		0%	0%	0%	0%	0%	0%	0%	0%
JMSOH	VA		0%	0%	0%	0%	0%	0%	0%	0%
JMSMH	VA		0%	0%	0%	0%	0%	0%	4%	3%
JMSPH	VA		0%	0%	0%	0%	0%	0%	44%	44%

Cbsegs	Scenario→		James L.O.E 1/2 Potomac 23.5N 2.35P							
	Year →		'91-'93	'92-'94	'93-'95	'94-'96	'95-'97	'96-'98	'97-'99	'98-'00
	State		CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal	CL Spring Seasonal
JMSTFL	VA		0%	0%	0%	0%	0%	0%	0%	0%
JMSTFU	VA		0%	0%	0%	0%	0%	0%	0%	0%
JMSOH	VA		0%	0%	0%	0%	0%	0%	0%	0%
JMSMH	VA		1%	0%	0%	0%	0%	0%	0%	0%
JMSPH	VA		0%	0%	0%	0%	0%	0%	0%	0%
Cbsegs	State		CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal	CL Summer Seasonal
JMSTFL	VA		0%	0%	0%	0%	2%	6%	6%	2%
JMSTFU	VA		0%	0%	0%	0%	0%	0%	0%	0%
JMSOH	VA		0%	0%	0%	0%	0%	0%	0%	0%
JMSMH	VA		0%	0%	0%	0%	0%	0%	1%	1%
JMSPH	VA		0%	0%	0%	0%	0%	0%	9%	9%

Attachment D

**HRPDC Comments Regarding
Draft Virginia Watershed Implementation Plan**



November 5, 2010

The Honorable Doug Domenech
Secretary of Natural Resources
Commonwealth of Virginia
P.O. Box 1475
Richmond, VA 23218

Re: Comments on Virginia's Draft Phase I Watershed Implementation Plan

Dear Secretary Domenech:

The Hampton Roads Planning District Commission (HRPDC) appreciates the opportunity to submit these joint comments on behalf of the cities of Chesapeake, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, and Williamsburg, and the counties of Isle of Wight, Gloucester, James City, Surry, and York ("Hampton Roads Localities" or "Localities") on Virginia's September 2010 draft Phase I Watershed Implementation Plan (WIP).

The cities of Chesapeake, Hampton, Newport News, Norfolk, Portsmouth, and Virginia Beach own Municipal Separate Storm Sewer Systems (MS4s) that operate under individual Phase I MS4 NPDES permits issued by the Virginia Department of Conservation and Recreation (DCR), while the cities of Poquoson, Suffolk and Williamsburg, and the counties of Isle of Wight, James City, and York own MS4s that operate under a general Phase II MS4 permit issued by DCR. At present, Gloucester and Surry are not designated as MS4s, but could be so designated in the future due to population growth or modification of the criteria used to designate MS4s.

A. Concerns with the WIP

The Hampton Roads Localities appreciate Virginia's efforts to incorporate flexibility and cost effectiveness into the WIP; however, the James and York river basin urban runoff sector allocations in the WIP would impose massive financial costs on the Hampton Roads MS4s in what surely would be a futile effort to reduce phosphorus loads by an average of almost 80 percent. As explained below, even with the larger backstop phosphorus allocation proposed by the U.S. Environmental Protection Agency (EPA) (average 54 and 59 percent phosphorus reductions for the James River and York River, respectively), **the Localities would still have to expend an estimated \$9.8 billion, plus the cost of land acquisition, to achieve the backstop sector allocations.** Although the State's proposed credit exchange concept would have helped to reduce the cost of compliance in the near

term, we fear that the WIP's long-term financial consequences could have been even worse for the reasons listed below.

We also appreciate Virginia's efforts to provide relief to the urban runoff sector by proposing to make credits from the point source and agriculture sectors available to assist the MS4s in attaining their sector allocations. However, even if EPA had endorsed the State's credit exchange proposal, it is unlikely that it would have been sufficient to avoid the immense long-term financial consequences associated with an obligation to reduce phosphorus loadings by almost 80 percent for several reasons. First, there is no assurance that the credits would be generated when and where needed; second, those credits generated from excess flow capacity would only be available to the MS4s on a temporary; and finally, the reductions that would be required of urban runoff with the WIP allocations are so great that the demand for credits could exceed the supply, thus driving up their cost and limiting their availability to the Localities, particularly if the Localities are forced to compete with private developers for the credits.

B. Impacts of the Proposed Allocations on the Hampton Roads Localities

Although the Hampton Roads Localities would fare better under EPA's James and York river basin backstop urban runoff sector allocations, the more than 50 percent reduction in phosphorus required to achieve the backstop allocation is still beyond a level that is practicable of attainment.

It is impossible to predict the full extent of the socio-economic consequences of attempting to achieve the backstop allocations because an undertaking of this magnitude has never been tried before. However, we can state with confidence that there is no assurance that the load reductions that would be required to achieve the backstop allocations can be accomplished by EPA's 2025 deadline, and that, on a pound-for-pound basis, the cost would be totally out of portion to any water quality benefit.

On average, the Localities and their residents would have to treat between 68 and 74 percent of the urban land area within their jurisdictions in order to achieve the over 50 percent reduction in phosphorus needed to attain the backstop allocations. It is estimated that it would cost the Hampton Roads Localities approximately \$9.8 billion (\$1.05 billion annualized) to reduce phosphorus loads to the levels needed to comply with the backstop allocations after factoring in the added cost of designing BMPs that would function effectively on the flat, low-lying terrain and in the soils and high water tables that reflect the dominate topography and hydrology in the Hampton Roads area. As explained in the enclosed copy of our comments on the draft TMDL, this equates to an annual storm water fee of \$1,670 per household, and \$720 per person.

Further, this cost estimate does not reflect the added cost of acquiring the land needed for the installation and maintenance of the BMPs required to achieve the backstop allocations. On average, the Localities own less than 15 percent of the 68 to 74 percent of urban land area that would have to be treated to attain the backstop phosphorus allocations. The remaining reductions would have to be achieved with retrofits on private land, and since the Localities cannot force private land owners to retrofit in the absence of redevelopment requiring local land use approvals, the Localities would have to negotiate for the purchase of the land needed for the easements or acquire the land by condemnation. Land acquisition is an expensive and time consuming process that will add greatly to the cost and time required to achieve the reductions.

C. Recommendations

First, the Hampton Roads Localities encourage Virginia to respond to EPA's backstop allocations by revising its WIP to include the additional commitments needed to demonstrate to EPA that the Commonwealth can achieve the draft WIP allocations for the agriculture and onsite septic systems sectors. Such a demonstration would remove the backstop allocations and allow Virginia to distribute a portion of the allocations now assigned to the agriculture sectors to the urban runoff and point source sectors. Should the backstop allocations be removed, it is important that Virginia assign a significant portion of the additional allocations to the urban runoff sector. The Hampton Roads Localities recognize the need to assign some portion of the additional allocations to the point source sector to accommodate long-term growth and to generate credits. However, as explained above, we believe the allocations in the WIP placed too much reliance on credits to offset the consequences of the small allocations to the urban runoff sector and did not reflect a cost-effective and equitable distribution among the two sectors.

As we explain in our comments on the TMDL, time is a more critical factor for the urban runoff sector than it is for any other source sector receiving allocations in the TMDL. This is because the cost of retrofitting existing development is directly related to the Localities' ability to impose retrofit requirements in land use approvals for re-development rather than having to acquire easements for the retrofits and installing the retrofits independent of re-development. The Localities expect that they will be receiving new MS4 permits within the next two years and that these permits will contain conditions based on the Bay TMDLs. Therefore, it is critical that the State include the largest urban runoff sector allocations possible in the final WIP. This will afford the Localities' a greater opportunity to comply with their permits cost-effectively through retrofits required at the time of re-development.

Second, we encourage the State to emphasize in its final WIP the critical importance of federal and state grant funding to assist the localities in achieving the load reductions called for in the final TMDL. As is evident from the cost estimates summarized above, local

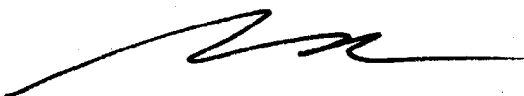
The Honorable Doug Domenech
November 5, 2010
Page 4

governments simply do not have the financial resources to implement their responsibilities under the TMDL. This is particularly true in the case of the urban runoff sector where the cost-per-pound of nutrients and sediment removed is far greater than any other source sector and where grant funding for storm water programs has been non-existent. In the absence of significant federal and state grant funding assistance, the urban runoff sector allocations are little more than a recipe for failure and will serve only to expose MS4s to federal enforcement. To protect MS4s, we also urge the State to make clear in its final WIP that the 2025 compliance deadline must be tied to the availability of significant federal and state grant funding for the urban runoff sector.

Finally, we encourage Virginia to take full advantage of the existing model capabilities to credit existing management practices that the State has not previously catalogued or reported to EPA. We also urge the State to formally request that EPA directly account for nutrient reductions attributable to filter feeders. It is apparent that EPA has made very little effort in the draft TMDL to incorporate additional, more cost-effective opportunities to achieve the basin-wide allocations. Crediting load reductions attributable to filter feeders such as oysters and menhaden and adopting an aggressive, targeted approach to reducing nitrogen loads from air deposition would reduce the need for other sectors to make more expensive nutrient reductions. Other cost-effective opportunities such as a federal commitment to funding the cost of installing wide-spread forested buffers should also be given serious consideration. Currently, neither the TMDL nor Virginia's WIP addresses any of these opportunities in a meaningful way. We urge the State to press EPA to remedy this deficiency when it establishes the final TMDL.

Thank you for the opportunity to submit these comments, and please let us know if you have any questions.

Sincerely,



Stan D. Clark
Chairman

Attachments: Comments on the Draft Chesapeake Bay TMDL by the Hampton Roads
Planning District Commission on behalf of the Hampton Roads Localities

Copies: Mr. Anthony Moore, Assistant Secretary of Natural Resources
Mr. David Johnson, Director, Department of Conservation and Recreation
Hampton Roads Planning District Commission

Attachment E

**VAMSA Comments Regarding the Draft TMDL
and
Draft Virginia Watershed Implementation Plan**

Note –The attachments referenced in the VAMSA comments will be hand delivered to the Virginia Department of Environmental Quality and the Virginia Department of Conservation and Recreation on Monday, November 8, 2010.



5 November 2010

BY HAND DELIVERY AND E-MAIL (VABAYTMDL@dc.virginia.gov)

Virginia Department of Conservation and Recreation
Central Office - Zincke Bldg., Suite 206
203 Governor St.
Richmond, Virginia 23219
Attn.: Russ Perkinson, Assistant Division Director

**Re: Draft Total Maximum Daily Load ("TMDL") for the Chesapeake Bay and
Virginia Chesapeake Bay Watershed Implementation Plan ("WIP")**

To Whom It May Concern:

On behalf of the Virginia Municipal Stormwater Association, Inc. ("VAMSA"), enclosed please find comments regarding drafts of the above-referenced TMDL and WIP.

Thank you for your consideration.

Sincerely,

A handwritten signature in black ink that reads "Randy Bartlett / JWS". The signature is written in a cursive, flowing style.

Randy Bartlett
President

Encl.

Copy to: VAMSA Members
Christopher D. Pomeroy, Esq.
Lisa M. Ochsenhirt, Esq.

Virginia Municipal Stormwater Association, Inc.
P.O. Box 51, Richmond, VA 23218 | voice: 804.716.9021 | fax: 804.716.9022



**COMMENTS OF THE
VIRGINIA MUNICIPAL STORMWATER ASSOCIATION, INC.
REGARDING U.S. EPA'S DRAFT CHESAPEAKE BAY TMDL AND
VIRGINIA'S DRAFT CHESAPEAKE BAY TMDL WIP**

I. INTRODUCTION & EXECUTIVE SUMMARY

On September 3, 2010, the Commonwealth of Virginia ("Virginia") submitted a Chesapeake Bay TMDL Phase I Watershed Implementation Plan ("Draft WIP"). On September 22, 2010, the United States Environmental Protection Agency ("EPA") issued a Notice of Availability of the Draft TMDL and request for public review and comment in the *Federal Register* regarding the development of a total maximum daily load for the Chesapeake Bay Watershed. On September 24, 2010, EPA issued a Draft Chesapeake Bay Total Maximum Daily Load ("Draft TMDL").

The Virginia Municipal Stormwater Association, Inc. ("VAMSA") hereby submits the following comments in response to the EPA's *Federal Register* Notice and Draft TMDL and Virginia's Draft WIP. VAMSA is a statewide association of Virginia localities that supports stormwater management based on good science and good public policy, including a balanced approach to environmental and fiscal sustainability. Many of VAMSA's members own or operate drainage systems, sometimes referred to as municipal separate storm sewer systems ("MS4s"), which receive and convey stormwater runoff to prevent flooding. These MS4s are regulated for water quality purposes under state-issued National Pollutant Discharge Elimination System ("NPDES") permits known in Virginia as Virginia Stormwater Management Program ("VSMP") permits. VAMSA's members have a strong interest in the development of the Bay TMDL and in its implementation at the state and local level.

As explained in greater detail in VAMSA's full comments below, EPA's Draft TMDL suffers from a number of fundamental flaws including the items discussed below. VAMSA also has concerns regarding the scope of the Urban Stormwater element of the WIP, which is addressed below where relevant.

Before turning to these issues, first we are compelled to point out the severe lack of a meaningful opportunity for public review and comment on these complex regulatory proposals. The development of the Bay models has required thousands of hours of time from dozens of EPA staff over many years. However, EPA has not provided an opportunity for the public to understand how the models work and the implications of changes to the input data sets for model results. These results define the allocations that EPA has proposed in the TMDL. Therefore, although the model is being used as far more than a "tool" and is essentially being used to define scope and extent of the TMDL requirements, it very much represents a "black box" that frustrates opportunities for meaningful public review and comment. Furthermore, VAMSA's sister association, the Virginia Association of Municipal Wastewater Agencies ("VAMWA"), has made requests for information to better understand specific issues of interest in the models,

but EPA has not responded to those requests. Against this background of complexity, EPA has only given the public 45 days to comment on what is arguably the most complex TMDL ever developed in the nation. We believe that the lack of transparency in combination with a limited review period fails to comply with both the spirit and the letter of the Administrative Procedure Act.

EPA Has Inappropriately Failed to Consider Cost, Cost-Effectiveness, and Cost-Benefit

Of particular relevance to Urban Stormwater and thus eventually to MS4s, EPA's Draft TMDL fails to adequately consider a critical aspect relating to whether or not its TMDL will be successful for Bay restoration, namely cost and feasibility, as well as cost-effectiveness and cost-benefit. VAMSA has similar concerns regarding the WIP as to Urban Stormwater.

An expert national engineering firm has estimated the cost to Virginia's MS4 localities to restore 50% of existing untreated impervious area over a 15 year term (the level and manner of effort assumed by EPA in its Draft TMDL at page 8-14 to 8-15). The low estimated *per household, annual* cost is \$678 in 2011 and possibly as high as \$1,717 in 2025.¹ Further, these staggering figures are only for the specific retrofits considered in EPA's plan and thus omit other significant existing and future costs for other MS4 permit obligations (such as under existing permits and potentially increased requirements under future permits and other TMDLs) and for general maintenance of the existing stormwater system.

On a state-wide basis (for localities in the Bay Watershed), a second expert engineering firm has confirmed the extraordinary costs for urban stormwater.² The firm has estimated the total capital costs for Virginia localities in the Bay Watershed to be approximately \$39.4 billion, with an annual cost (including O&M) of \$4.2 billion. Based upon a typical industry approach to calculating stormwater bills, this translates to approximately \$1,200 per year for a representative residential house, \$11,100 per year for a representative small business (e.g., convenience store or gas station), \$73,800 per year for a representative neighborhood shopping center, \$24,600 per year for a representative church or place of worship, and \$1.1 million per year for a representative regional mall. This would place a high burden on a household based upon median household income (approximately 2.0% to 2.7%).

Elsewhere, EPA has estimated that the cost for retrofits for existing MS4s may be ***\$7.9 billion per year*** for the Bay TMDL watershed. Furthermore, the nationally-recognized Center for Watershed Protection has estimated urban retrofit costs at on the order of ***\$88,000 per acre***.

¹ Stormwater Retrofit Cost Estimate Case Study, D. Mason and C. Tabor, CDM (Oct. 12, 2010) (attached as Appendix 1). VAMSA hereby incorporates Appendix 1 by reference to these comments (all of VAMSA's Appendices are incorporated hereto by reference). Additionally, VAMSA incorporates by reference all EPA files or documents, no matter the form, and all materials from EPA Chesapeake Bay committees or subcommittees pertaining to Bay clean-up efforts. VAMSA is aware that a growing number of localities and planning district commissions throughout Virginia may have similar concerns and to the extent that such entities file comments on the Draft TMDL or WIP, VAMSA recommends that EPA and Virginia carefully consider those comments as well.

² Range of Estimated Costs for Virginia Urban Runoff (Stormwater), E. Cronin, Greeley & Hansen (Nov., 2010) (attached as Appendix 1).

Given the current economic environment and the level of associated costs, VAMSA cannot begin to understand EPA's decision to sidestep discussing the potential economic impact of the Bay TMDL on the residents of the Bay watershed, especially in light of the fact that EPA stopped its effort to conduct a Use Attainability Analysis as part of this TMDL process.

Furthermore, the Draft TMDL also does not consider cost effectiveness, sustainability, or overall environmental benefit. VAMSA is aware of the development of the Best Management Practices Benefit Planner ("BMP-BP") model discussed in VAMWA's comments. This peer reviewed model (reviewed by Virginia Tech) was designed to consider implementation costs, energy requirements, green house gas emissions, and ancillary environmental benefits (e.g. creation of wildlife habitat, flood protection, human health protection) to support environmental decision making.

VAMWA used this model to compare EPA's recommendations for the York River basin with an alternative scenario that would achieve a similar level of nutrient reduction. The alternative scenario consisted of reducing urban stormwater retrofit acreage by 50% from EPA's 50% concept, retaining municipal wastewater treatment plants at their stringent state regulatory levels, and increasing agricultural BMPs by 20%. This demonstrated the following benefits:

- Reduced capital costs by approximately 50% (~\$1B)
- Reduced operation and maintenance (O+M) costs by 50% (\$32M/yr)
- Increased carbon sequestration by approximately 20%
- Significantly reduced green house gas (GHG) emissions
- Increased ancillary benefits associated with wildlife habitat, flood hazard protection, and base-flow projection.

VAMSA is providing this example not to endorse the specific inputs listed in these bullets (including the still-extremely-expensive stated urban stormwater retrofits), but to make the general point that EPA could have and should have designed the TMDL to achieve greater environmental benefit, at a far lower cost. EPA should correct these lose-lose outcomes prior to finalizing the Bay TMDL. Failure to do so would be arbitrary and unreasonable.

VAMSA appreciates and supports the more flexible approach evident in the WIP as to Urban Stormwater, including crediting non-structural BMPs such as urban nutrient management, fertilizer restrictions, restrictions on improper waste disposal, street sweeping, and expanded trading program, all of which are listed at pages 78-79. Nevertheless, VAMSA has similar concerns with the WIP regarding the overall level of effort and associated costs.

From a local governmental perspective, it is imperative that the final TMDL and WIP retain flexibility for reasonable decision-making and implementation approaches and mechanisms at the local level that take into account cost considerations, reasonableness of rates for taxes/fees to implement the TMDL, and other relevant considerations.

EPA's Unpromulgated "Reasonable Assurance" Regulation Does Not Support EPA's Proposed Disapproval of the WIP and Imposition of "Backstop" Allocations

In its Draft TMDL, EPA proposed backstops based upon its view that Virginia's Draft WIP provided less than adequate "reasonable assurance" that its plan would achieve the nonpoint source load allocations. EPA's position on "reasonable assurance" is unreasonable and unlawful for many reasons.

First, EPA has no authority pursuant to the Clean Water Act ("CWA") to review and/or approve or disapprove Virginia's WIP.

Second, EPA's action is inconsistent with thousands of prior EPA actions.

Third, it is unreasonable for a federal agency to announce TMDL caps and just a couple months later expect a state administrative agency (*i.e.*, no lawmaking or taxing authority) to clearly document what the future laws and taxes will be to support implementation of the EPA mandate.

Fourth, EPA's "reasonable assurance" proposal and related backstops unreasonably increases the already heavy burden on urban stormwater.

EPA's Decision to Reject Virginia's Expanded Trading Option Is Unreasonable

Virginia's WIP includes provisions for expansion of its existing nutrient trading program to include agriculture, urban stormwater, and other sectors. In addition, Virginia's Draft WIP (unlike EPA's Draft TMDL) does not include mandatory retrofits/restoration of impervious area. Taken together, these two aspects of Virginia's plan would give affected parties the flexibility to incorporate cost effectiveness into management decisions. Unfortunately, EPA has largely ignored cost considerations in developing the TMDL. In fact, EPA has acknowledged in recent public meetings that the TMDL does not consider affordability or cost-effectiveness. Unlike EPA, local governments (including MS4 owners) have a responsibility to their citizens to seek cost-effective solutions. By ignoring cost, EPA's disapproval of Virginia's WIP essentially conflicts with the public interest in efficient and affordable regulations. EPA's acceptance of Virginia's intent to consider trading program expansion would help address this major shortcoming of the TMDL, though attainability of the TMDL remains a major question.

EPA's Choice of Daily Loads That Are Too Low and Its Failure to Appropriately Address MS4 Allocations is Unreasonable

VAMSA is concerned that EPA has not appropriately addressed daily loads in the Bay TMDL. Existing Chesapeake Bay programs are properly built on the concept of annual load. As to point source permitting, this approach has been documented in an EPA 2004 Memorandum, and VAMSA supports that approach. In the TMDL, however, EPA has inappropriately set daily loads at the segment level based upon the 95% percentile and indicates this statistical approach assumes the daily maximum load would be violated 5% of the time. Obviously this is acceptable to EPA as this statistic does not represent a real world water quality problem, and VAMSA agrees. However, VAMSA believes that higher daily loads would be appropriate, and that the

ecological insignificance of daily should be clarified, particularly in the context of WLAs for MS4s. MS4s have discharges that are highly influenced by uncontrollable precipitation events.

In addition, EPA has not clearly addressed the distinction between TMDL WLAs and MS4 effluent limitations. Consistent with EPA's existing regulations and guidance, the Bay TMDL should clearly state that MS4s are not subject to numeric effluent limitations. Under section 402(p) of the CWA, the legal compliance standard for MS4s is based on a "maximum extent practicable" ("MEP") level of effort. Here, given the extremely stringent proposed allocations, this should be made clear in the TMDL.

Other Issues

There are a number of other material deficiencies in the TMDL that render it arbitrary, unreasonable and legally indefensible, including:

- EPA's Approach to James River (Chlorophyll-*a*) is Unreasonable
- EPA's Bay Model is Flawed
- EPA's View of Relative Effectiveness is Incorrect
- EPA's Backstops Eliminate Planned Agricultural Load Reductions Despite those Controls Being Among the Most Cost-Effective Measures for Improvement
- EPA's Failure to Explicitly Include Filter Feeders and Alternative Technologies in the Bay TMDL is Unreasonable
- EPA's Failure to Aggressively Target Air Deposition is Unreasonable
- The American Canoe and Kingman Park Consent Decrees do not Address Virginia Chlorophyll-*a*

VAMSA expands on its comments below.

II. EPA HAS INAPPROPRIATELY FAILED TO CONSIDER COST, COST-EFFECTIVENESS, AND COST-BENEFIT

Available cost estimates indicate that the Bay TMDL could have cost impacts on the order of \$700 to \$1,800 per household per year. Yet, EPA has failed to consider this significant issue in its Draft TMDL.

In order to withstand appellate scrutiny by a Federal Court, EPA must be able to meet the "arbitrary and capricious" standard of review for a federal agency action mandated by the Administrative Procedure Act.³ Specifically, a Federal Court will "...hold unlawful and set

³ 5 U.S.C. §500, *et seq.*

aside agency action, findings, and conclusions found to be arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law...”⁴ The U.S. Court of Appeals for the D.C. Circuit explained that an action will be held arbitrary and capricious:

...if the agency has relied on factors which Congress has not intended it to consider, **entirely failed to consider an important aspect of the problem**, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise...⁵

Given that one of the main limitations on fully accomplishing Bay restoration has been the tremendous cost, EPA’s failure to consider cost, cost-effectiveness, or cost-benefit in its Draft TMDL is the epitome of agency decision-making that fails “to consider an important aspect of the problem.”⁶

EPA’s Draft TMDL allocates reductions among various source sectors. VAMSA believes that considerations of cost, cost-effectiveness and cost-benefit are imperative parts of determining how to make these allocations. It is hard to imagine how EPA could have made a reasoned decision on this issue without considering cost, cost-effectiveness, and cost-benefit. EPA certainly should not have, given the scope of the Bay TMDL. In addition, a consideration of cost issues, in particular a careful review of which options are the most cost-effective, would benefit EPA, by providing more reasonable assurance for this TMDL. Cost-effective measures are much more likely to actually be implemented, and implemented on schedule, as compared to measures that are extraordinarily expensive. EPA’s refusal to consider cost contradicts its own demands for reasonable assurance. This is unacceptable, particularly in light of the fact that there is insufficient federal funding for the clean-up and local resources are strained in a way that they have not been for many decades.⁷

Although economics at the state level have improved slightly over the last year, local governments continue to suffer with tightening local budgets and reduced revenues. According to an October, 2010 Research Brief from the National League of Cities (“NLC”), “Local and regional economies characterized by struggling housing markets, slow consumer spending, and high levels of unemployment are driving declines in city revenues.” The October brief shows

⁴ 5 U.S.C. §706(2)(A).

⁵ Eagle Broadcasting Group, Ltd. v. F.C.C., 563 F.3d 543, 551 (D.C. Cir. 2009) (emphasis added).

⁶ EPA materials from April, 2009, show a willingness on EPA’s part to consider affordability as a part of this process. See April 20-21, 2009 Presentation from B. Koroncai to PSC (Chesapeake Bay Water Quality Big Picture) at slide 13 (“An affordability assessment will be completed”) (attached hereto as Appendix 2). Yet, EPA’s Draft TMDL leaves the question of affordability entirely unaddressed.

⁷ In November, 2009, the Governors of Virginia and Maryland wrote to the President asking that he consider the need for federal assistance for Bay clean-up efforts (attached as Appendix 3). Note that the letter was written in response to the Executive Order strategy and reports. VAMSA submits that financial need is even more dire now given the requirements of the Draft TMDL. See also June 15, 2010 Letter from Virginia Governor Robert E. McDonnell to Lisa P. Jackson, EPA Administrator (attached hereto as Appendix 4).

that concerns over local fiscal health remain at the highest level in the 25 year history of the survey. Two of the major issues plaguing cities are declines in personal property and sales tax. As a result, NLC concludes that:

2010 reflects a number of downward trends for city fiscal conditions. The impacts of the economic downturn are becoming increasingly evident in city projections for final 2010 revenues and expenditures, and in the actions taken in response to changing conditions. The local sector of the economy is now fully [sic] the midst of a downturn that will be several years in length. The effects of a depressed real estate market, low levels of consumer confidence, and high levels of unemployment will likely play out in cities through 2010, 2011, and beyond.⁸

The National Association of Counties also conducted a survey of sample counties across the United States in June, 2010 (“How are Counties Doing? An Economic Status Survey”). According to the Executive Summary: “This survey reveals that the downturn continues to be widespread with counties of all sizes feeling the crunch from many directions.” Furthermore, “[c]ounties report that they are using furloughs, layoffs and service curtailment to help reduce budgets that in many cases remain problematic because of continuing shortfalls.”⁹

In short, Virginia’s local governments are in no position to fund an expensive and mandatory restoration/retrofit program. Of course, this begs the question: How much would it cost to implement EPA’s urban restoration/retrofit proposal?

VAMSA submits for consideration by EPA and the State the attached Technical Memo by a national engineering firm with expertise in stormwater management.¹⁰ The Technical Memo estimates urban stormwater costs for Bay TMDL implementation on an annual per household cost basis. For a level of effort that approximates that of the Draft TMDL, the analysis developed cost estimates to restore 50% of existing untreated impervious area over a 15 year term (the approach used by EPA in its Draft TMDL). ***The result was an annual per household cost from a low of \$678 per year in 2011 to a high of \$1,711 in 2025.***

The Technical Memo’s cost estimate is only for urban retrofits; it does not include costs for stormwater management in unregulated areas or to pay for other costs associated with existing MS4 programs. Thus, total stormwater management cost increases would presumably be considerably higher factoring in increasing requirements of MS4 permits, costs of implementing other TMDLs beyond the Bay TMDL, and generally increasing liability for infrastructure renewal.

⁸ October Research Brief at 7 (available online at http://www.nlc.org/ASSETS/AE26793318A645C795C9CD11DAB3B39B/RB_CityFiscalConditions2010.pdf).

⁹ Survey results available online at: <http://www.naco.org/research/pubs/Documents/Surveys/Research%20Surveys/How%20are%20Counties%20Doing%20An%20Economic%20Status%20Survey%20July%202010.pdf>

¹⁰ See Appendix 1.

On a state-wide basis (for localities in the Bay Watershed), a second expert engineering firm has confirmed the extraordinary costs for urban stormwater.¹¹ The firm has estimated the total capital costs for Virginia localities in the Bay Watershed to be approximately \$39.4 billion, with an annual cost (including O&M) of \$4.2 billion. Based upon a typical industry approach to calculating stormwater bills, this translates to approximately \$1,200 per year for a representative residential house, \$11,100 per year for a representative small business (e.g., convenience store or gas station), \$73,800 per year for a representative neighborhood shopping center, \$24,600 per year for a representative church or place of worship, and \$1.1 million per year for a representative regional mall. This would place a high burden on a household based upon median household income (approximately 2.0% to 2.7%).

Elsewhere, EPA has estimated that the cost for retrofits for existing MS4s may be ***\$7.9 billion per year*** for the Bay TMDL watershed.¹²

The nationally-recognized Center for Watershed Protection has estimated urban retrofit costs at on the order of ***\$88,000 per acre***.¹³

A. Case Study Demonstration: York River Basin

Agricultural management practices include most of the practices that EPA and others (e.g., Chesapeake Bay Commission, 2004) have identified as the most-cost effective, including nutrient management, conservation tillage, cover crops, and riparian buffers. Compared to many urban and wastewater-based practices, these practices provide much higher levels of ancillary environmental benefits such as wildlife habitat, stream habitat protection, flood control, and greenhouse gas reduction. To illustrate these points, Appendix 5 presents a case study of alternative nutrient controls for the York River basin using the Virginia Tech peer reviewed *BMP Benefit Planner* ver. 1.1 (Malcolm Pirnie, 2010). For the case study the above referenced model was used to compare EPA's recommendations for the York River basin with an alternative scenario that would achieve a similar level of nutrient reduction. The alternative scenario consisted of returning municipal point sources to existing requirements (TN= 6 mg/L, TP=0.7 mg/L, design flows), ***reducing urban storm water BMP acreage by 50%*** and increasing agricultural BMPs by 20%. The results indicated the following:

- ***Reduced capital costs by approximately 50% (~\$1B)***
- Reduced operation and maintenance (O+M) costs by 50% (\$32M/yr)
- Increased carbon sequestration by approximately 20%
- Significantly reduced green house gas (GHG) emissions
- Increased ancillary benefits associated with wildlife habitat, flood hazard protection, and base-flow projection

¹¹ See Appendix 1.

¹² The Next Generation of Tools and Actions to Restore Water Quality in the Chesapeake Bay: A Revised Report Fulfilling Section 202a of Executive Order 13508 (Nov. 24, 2009).

¹³ See Appendix 1.

VAMSA is providing this example not because we agree with the specific inputs (in particular the urban stormwater aspects), but to make the general point that it is possible to derive a greater environmental benefit at a lower cost if flexibility is allowed in the TMDL. EPA should consider these types of cost issues and options before it finalizes the Bay TMDL. To do otherwise is indefensible.

This case study approach is consistent with the intent of EPA's Healthy Watersheds Initiative. This initiative advocates for a holistic approach to management that includes geomorphology, landscape condition, hydrology, habitat, and biological integrity (http://water.epa.gov/learn/training/wacademy/upload/2010_10_13_slides.pdf). EPA has contradicted its own concepts with the Bay TMDL by a narrowing its focus to only nutrient loadings at the exclusion of other end-points important to healthy watersheds.

VAMSA appreciates and supports the more flexible approach evident in the WIP as to Urban Stormwater, including crediting non-structural BMPs such as urban nutrient management, fertilizer restrictions, restrictions on improper waste disposal, street sweeping, and expanded trading program, all of which are listed at pages 78-79. Nevertheless, VAMSA has similar concerns with the WIP regarding the overall level of effort and associated costs.

From a local governmental perspective, it is imperative that the final TMDL and WIP retain flexibility for reasonable decision-making and implementation approaches and mechanisms at the local level that take into account cost considerations, reasonableness of rates for taxes/fees to implement the TMDL, and other relevant considerations.

III. EPA'S UNPROMULGATED "REASONABLE ASSURANCE" REGULATION DOES NOT SUPPORT EPA'S PROPOSED DISAPPROVAL OF THE WIP AND IMPOSITION OF "BACKSTOP" ALLOCATIONS

EPA has concluded that Virginia's WIP fails to comply with EPA's July 1, 2010 and August 13, 2010 nutrient and sediment allocations¹⁴ and does not adequately establish reasonable assurance. EPA has established what it is calling a "backstop allocation" in response. This backstop is meant to "...reduce the point source loadings as necessary to compensate for the deficiencies EPA identified in the reasonable assurance components of the jurisdictions' draft Phase I WIPs addressing nonpoint source reductions."¹⁵

Each of the Bay States received a "minor," "moderate," or "high" backstop depending upon EPA's view of how severely the state had missed the allocation targets and reasonable assurance mandate. Virginia received a "moderate" backstop to bridge the gap between EPA's

¹⁴ EPA's letters to Virginia Secretary of Natural Resources Doug Domenech establishing nutrient and sediment allocations are attached hereto as Appendix 6.

¹⁵ Draft TMDL at 8-9.

expectations and the Virginia Draft WIP.¹⁶ The “moderate” backstop addresses MS4s as follows:

MS4s: 50 percent of urban MS4 lands meet aggressive performance standard through retrofit/redevelopment; 50 percent of unregulated land treated as regulated, so that 25 percent of unregulated land meets aggressive performance standard; designation as necessary.¹⁷

VAMSA strongly opposes the use of backstops in Virginia. EPA’s application of its reasonable assurance “regulation” is unlawful, unprecedented and certainly unwarranted under the circumstances. EPA has no justifiable basis (or legal authority) for setting any backstops in Virginia.

This approach to urban stormwater differs from the approach taken by Virginia in its Draft WIP. Virginia’s Draft WIP does not mandate retrofits/restoration of impervious area.¹⁸ Furthermore, Virginia’s Draft WIP includes a plan for allowing municipalities to participate in an expanded version of the Virginia Nutrient Credit Exchange:

When the Chesapeake Bay TMDL is issued, about half the land area of the Commonwealth will be under nutrient and sediment load allocations that cap the discharge of these pollutants from point source and non-point sources. Unless changed, these pollutant allocations will become permanent pollutant caps on each of the major Virginia river basins that all the source sectors, added together, cannot exceed. In order to help meet the challenging pollution reduction requirements imposed by the Bay TMDL, this Phase 1 WIP recommends the Commonwealth expand the nutrient credit exchange program to better ensure that future nutrient and sediment reduction actions are as equitable and as cost-effective as possible among all of the source sectors. An expanded program also allows local decision-makers to consider nutrient and sediment generating potential as they face development, land use, and capital planning challenges.¹⁹

VAMSA submits that EPA’s position on reasonable assurance, and in turn its treatment of stormwater, is untenable for three reasons.

First, EPA’s view of reasonable assurance in this TMDL is unprecedented at the federal or state level. EPA has written and/or approved thousands of TMDLs for impaired waters across the

¹⁶ Draft TMDL at 8-19.

¹⁷ Draft TMDL ES-9.

¹⁸ Draft WIP at 14.

¹⁹ Draft WIP at 4-5. This does not mean that VAMSA fully supports Virginia’s Draft WIP, as it suffers from many of the cost-related problems noted above with regard to EPA’s Draft TMDL. However, VAMSA does support the flexibility Virginia has given the urban stormwater sector in the WIP vis-à-vis expanding Virginia’s existing trading program.

United States. Because the phrase “reasonable assurance” is undefined in either the CWA or in regulations or in guidance,²⁰ EPA’s approach to reasonable assurance has ranged from liberal to more conservative.²¹

As examples, EPA’s Paxton Creek Watershed TMDL (nutrients, sediment), Goose Creek Watershed TMDL (nutrients), Sawmill Run TMDL (nutrients), and Southampton Creek Watershed TMDL (nutrients and sediment) all contain weak reasonable assurance provisions that fail to link the identified BMPs to implementation programs. In addition, these TMDLs suggest that BMP implementation should only “eventually” meet load allocation reductions goals.²² EPA has approved many TMDLs, including the Anacostia River Basin Watershed TMDL (sediment, TSS), the Anacostia River Basin Watershed TMDL (BOD, nutrients) and the Tidal Potomac River TMDL (PCBs), which lack schedules for reductions and consequences for failure to meet load allocations. If EPA had a basis for approving these TMDLs, VAMSA cannot understand how it could now argue that reasonable assurance is so lacking in the Bay TMDL that backstops are necessary.²³

Furthermore, what EPA has done in its Draft TMDL is really to promulgate a new rule—i.e., a new regulatory definition of “reasonable assurance”—without following proper regulatory procedure. EPA appears to be attempting a “do-over” of its previously unsuccessful rulemaking in the early part of the decade. On July 13, 2000, EPA published a final rule, which would have incorporated a definition of reasonable assurance into 40 C.F.R. Part 130.²⁴ However, Congress, states, industrial and agricultural groups, and environmental organizations opposed the rule; and,

²⁰ EPA guidance merely “define[s] when reasonable assurance must be demonstrated but not really what it is.” Reasonable Assurance Workgroup Findings and Options, Principals’ Staff Committee Meeting, Washington, D.C., at 13 (Sept. 22, 2008) (attached hereto as Appendix 7).

²¹ In 2008, EPA’s CBPO’s Principal’s Staff Committee established the “Reasonable Assurance Workgroup.” Part of the Workgroup’s charge was to develop recommendations for how “reasonable assurance” would be used for purposes of developing the Bay TMDL. Some of the materials prepared by this Workgroup (attached hereto as Appendix 7) confirm that not only is “reasonable assurance” undefined in federal law, but that EPA has previously based TMDLs on a number of different views on reasonable assurance (e.g., EPA has approved a “[b]road spectrum of acceptable reasonable assurance demonstrations in 30,000 TMDLs approved by EPA.”).

²² See Chesapeake Bay Program Principals’ Staff Committee’s Reasonable Assurance Workgroup, July 23, 2008 Conference Call, Attachment B, Appendix 1, Examples of Reasonable Assurance: Best Practices from EPA-Approved and Published TMDLs and Suggestions from other Sources, at 9-10.

²³ VAMSA hereby incorporates by reference all of the TMDLs EPA has written or approved and all supporting materials. These materials should be publicly available and located in EPA’s files. A list of those TMDLs, although not entirely complete, is available at the following link:
http://mail.aqualaw.com/exchweb/bin/redir.asp?URL=http://iaspub.epa.gov/waters10/text_search.tmdl_search_form

²⁴ Revisions to the Water Quality Planning and Management Regulation and Revisions to the National Pollutant Discharge Elimination System Program in Support of Revisions to the Water Quality Planning and Management Regulation, 65 Fed. Reg. 43,586 (July 13, 2000) (attached as Appendix 8).

EPA withdrew it in 2003.²⁵ Although EPA may be frustrated by an inability to define “reasonable assurance” in its regulations, there is no justification for defining it as a part of this TMDL without allowing for public participation and comment.

EPA’s Draft TMDL is inconsistent with earlier statements it has made on this subject. For example, in September, 2008, Region III responded to a letter from Maryland’s Secretary of Natural Resources John Griffin.²⁶ In response to a question regarding reasonable assurance, EPA stated that:

EPA Regions II and III, our partner states and the District are committed to accelerating restoration of the Chesapeake Bay and its tributaries, and EPA Region III believes that reasonable assurance provisions in the Bay TMDL will provide one mechanism to increase the likelihood that actions are taken to reduce nutrient and sediment loads. **However, EPA Region III does not believe that implementation of the Bay TMDL depends solely on reasonable assurance or any other single TMDL element.** Rather, EPA Region III is committed to working with the States and the District to develop and execute a broader implementation framework that draws on elements in the TMDL itself (including reasonable assurance), as well as additional implementation-related information that will accompany the TMDL.²⁷

As the discussion above makes clear, EPA’s “new” strict definition of “reasonable assurance” in the Draft TMDL is unjustified based upon prior practice.

Second, it is not clear that EPA has adequately factored in the Bay States’ two-year milestones into its reasonable assurance determination. This is directly contrary to EPA’s statements in 2008 that the two-year milestones would be part of the criteria considered by EPA “as part of its reasonable assurance and implementation framework...”²⁸ These two-year milestones should be a sufficient backstop to the WIPs to establish adequate reasonable assurance. The Chesapeake Bay Executive Council decided in 2008 that each of the Bay States would provide a set of target reductions and associated management efforts by which EPA could judge progress towards ultimate clean-up goals every two years.²⁹ EPA followed up on the Executive Council’s actions by issuing a letter in December, 2009 promising “consequences” for those Bay States who fall short of those two-year milestones. Although VAMSA disagrees with the concept of

²⁵ Withdrawal of Revisions to the Water Quality Planning and Management Regulation and Revisions to the National Pollutant Discharge Elimination System Program in Support of Revisions to the Water Quality Planning and Management Regulation 68 Fed. Reg. 13,608, 13,609 (March 19, 2003) (attached as Appendix 9).

²⁶ This letter is attached as Appendix 10.

²⁷ Letter from EPA Region III to Secretary John Griffin, Enc. A at p. 2.

²⁸ Letter from EPA Region III to Secretary John Griffin, Enc. A at p. 2.

²⁹ The first set of two-year milestones are attached hereto as Appendix 11.

“consequences,” EPA has not explained in its Draft TMDL why this additional accountability is inadequate for “reasonable assurance” purposes.

In a larger sense, the two-year milestones are also pieces of a larger 15 year plan (based upon an implementation period that runs from 2011 to 2025). The two-year milestones provide EPA with an opportunity to perform a regular “check-up” to determine whether the Bay States are accomplishing the goals they have set. But, the program itself also allows for adjustments over the full implementation period. EPA’s reasonable assurance is assured by the process. Simply put, we will have the opportunity to manage this program as time goes by. EPA’s view that reasonable assurance must be established in absolute terms today is short-sighted and unreasonable.

Third, and lastly, EPA has inappropriately rejected an important element of Virginia’s approach to reasonable assurance—*i.e.*, expansion of the existing nutrient trading system to include additional source sectors. As a general matter, EPA should have provided due deference to Virginia’s Draft WIP.

And, with regard to this issue, EPA should have allowed Virginia to move forward with its plan to develop an expanded trading program. Virginia has a stellar track-record with regard to market-based trading, having established a very successful PS trading program. Virginia has earned the right to show how it could expand that program in a way that would provide reasonable assurance of needed reductions.

For these reasons above, VAMSA objects to EPA’s determination to impose a “backstop” that mandates retrofits. This error must be corrected before EPA issues its final TMDL. For the above reasons, EPA’s position on “reasonable assurance” is unlawful and unreasonable and arbitrary and capricious.

VAMSA’s position is further supported by the fact that EPA has no authority pursuant to the CWA to review and/or approve or disapprove Virginia’s Draft WIP. EPA’s decision to do so, and its proposal to override Virginia’s WIP, is unlawful.

VAMSA does not dispute that TMDL implementation planning is important for moving clean-up programs ahead after TMDL adoption and for illustrating NPS reductions plans. However, because WIPs are not derived from CWA section 303(d) authority,³⁰ the details of these plans are not subject to EPA approval or control. EPA’s decision in its Draft TMDL to create

³⁰ Section 303(d) of the Clean Water Act mandates that states must prepare TMDLs for impaired waters, and authorizes EPA to approve or disapprove the loadings. If EPA chooses to disapprove, it has the authority to develop loadings on its own accord (“If the Administrator disapproves such identification and load, he shall not later than thirty days after the date of such disapproval identify such waters in such state and establish such loads for such waters as he determines necessary to implement the water quality standards applicable to such waters and upon such identification and establishment the State shall incorporate them into its current plan under subsection (e) of this section.”) 33 U.S.C. §1313. Section 303(e) specifically gives the State the authority and responsibility to develop a “continuing planning process” for addressing navigable waters. A part of this planning process is TMDLs (again, TMDL implementation plans are not mentioned). Nowhere in the text of Section 303(d) or (e) is EPA permitted to pass judgment on state implementation plans.

“backstops”—requirements that in effect revise the Virginia’s Draft WIP—is not supported by federal law.

In addition to acting without specific authorization from federal law, EPA’s actions are also inconsistent with state primacy granted by Section 510 of the Act:

Except as expressly provided in this Act, nothing in this Act shall (1) preclude or deny the right of any state or political subdivision thereof or interstate agency to adopt or enforce (A) any standard or limitation respecting discharges of pollutants, or (B) any requirement respecting control or abatement of pollution; except that if an effluent limitation, or other limitation, effluent standard, prohibition, pretreatment standard, or standard of performance is in effect under this Act, such State or political subdivision or interstate agency may not adopt or enforce any effluent limitation, or other limitation, effluent standard, prohibition, pretreatment standard, or standard of performance which is less stringent than the effluent limitation, or other limitation, effluent standard, prohibition, pretreatment standard, or standard of performance under this Act; or (2) be construed as impairing or in any manner affecting any right or jurisdiction of the States with respect to the waters (including boundary waters) of such States.”³¹

Federal law clearly gives Virginia the authority to develop its own requirements and programs, so long as they are not less stringent than those established under the Act.³² Because EPA has no statutory authority to establish WIPs, it is impossible for Virginia’s Draft WIP to be less stringent.

For these reasons, Virginia should have the discretion to establish its own WIP, without EPA passing judgment and usurping what is rightfully the state’s role in this process.

IV. EPA’S DECISION TO REJECT VIRGINIA’S EXPANDED TRADING OPTION IS UNREASONABLE

Virginia’s WIP includes provisions for expansion of its existing nutrient trading program to include agriculture, urban stormwater, and other sectors. Implementation of an expanded trading program would enable affected parties to incorporate cost effectiveness into management decisions, which is essentially as EPA has largely ignored cost considerations in developing the TMDL. In fact, EPA has acknowledged in recent public meetings that the TMDL does not consider affordability or cost-effectiveness. Local governments (including MS4 owners) have a responsibility to their citizens to seek cost-effective solutions. By ignoring cost, EPA’s disapproval of Virginia’s WIP essentially conflicts with the public interest in efficient and affordable regulations. EPA’s acceptance of Virginia’s intent to consider trading program expansion would help address this major shortcoming of the TMDL. As discussed above,

³¹ 33 U.S.C. 1370.

³² Virginia law (Chesapeake Bay and Virginia Waters Clean-Up and Oversight Act) includes a provision for the development of a Bay clean-up plan. Va. Code 62.1-44.117.

Virginia has an excellent track record with regard to its existing trading program. There is no reasonable basis for EPA's rejection of Virginia's approach to expanded trading.

V. EPA'S CHOICE OF DAILY LOADS THAT ARE TOO LOW AND ITS FAILURE TO APPROPRIATELY ADDRESS MS4 ALLOCATIONS IS UNREASONABLE

EPA has not appropriately addressed daily loads in the Bay TMDL. Existing Chesapeake Bay programs were built on the concept of annual load goals. A correct approach on this point is critical for cost-effectiveness and attainability.

It is well established that daily nutrient load variations are environmentally insignificant to the Bay. Furthermore, EPA determined in a 2004 Memorandum,³³ and cited by EPA at Draft TMDL, 4-9) that *annual* limits are appropriate in CWA permitting. EPA has stated that:

- The exposure period of concern for nutrient loadings to the Bay and its tidal tributaries is very long;
- The area of concern is far-afield (as opposed to the immediate vicinity of the discharge); and
- The average pollutant load rather than the maximum pollutant load is of concern.

Based on modeling, EPA concluded that "Chesapeake Bay and its tidal tributaries in effect integrate variable point source monthly loads over time, so that as long as a particular annual total load of nitrogen and phosphorous is met, constant or variable intraannual load variation from individual point sources has no effect on water quality in the main bay."³⁴ According to EPA, "[e]ven a simply steady-state model for permit development such as dividing the annual limit by 12 and establishing that value as the monthly limit is therefore not appropriate."³⁵

EPA has repeated its 2004 message in the Draft TMDL:

Numerous Chesapeake studies show that annually based wastewater treatment nutrient reductions are sufficient to protect Chesapeake Bay water quality (Linker 2003, 2005). The seasonal aspects of the jurisdictions' Chesapeake Bay WQS are due to the presence of the living resources being protected, but annual nutrient and sediment load reductions are most important to achieve and maintain the seasonal water quality criteria, some of which span multiple seasons—open-water, shallow-water bay grass, migratory spawning and nursery...³⁶

³³ Attached hereto as Appendix 12.

³⁴ 2004 Memorandum at 3.

³⁵ Id. at 5.

³⁶ Bay TMDL at 6-6.

In its Draft TMDL, EPA established maximum daily loads for each of the 92 impaired segments in the TMDL, and provided an explanation for how the reader could calculate the seasonal maximum daily load “for any segment, WLA, or LA of interest.”³⁷ EPA also provided annual WLAs and LAs in Draft Appendix Q.

Given that VAMSA members handle stormwater and have no control over when and how much it rains, VAMSA objects to EPA’s decision to set daily loads at an impaired segment level (rather than the Bay level only), and to establish daily loads based upon the 95% percentile of daily loads.³⁸ This means that, even if the TMDL were fully achieved, and the modeling has perfectly captured flows, the daily maximum load would be “violated” 5% of the time, or approximately one day out of every twenty.

This methodology would not be as critical if EPA had clearly stated that it would not be using daily WLAs for permitting or compliance purposes for regulated sources. This is highly problematic and inappropriate given the fact that the compliance standard for MS4s per the CWA is “MEP” (maximum extent practicable) and not compliance with a daily numeric loading.

For these reasons, EPA should revise its Draft TMDL to clearly state that daily loads will not be the yardstick against which MS4 compliance is measured, and further, that MS4s will not be required to comply with any numeric allocations found in the Draft TMDL (even if they are provided in aggregated form). This should be clear in the body of the TMDL itself (e.g., in Section 6) and in all appendices that reference daily loads.

VI. OTHER ISSUES

A. EPA’s Approach to James River Chlorophyll-*a* is Unreasonable

In the Draft TMDL, EPA has proposed drastic cuts to the James River allocations. This is the result of a remarkable confluence of technical and policy problems: an unstable, poorly-calibrated model forcibly applied to a scientifically dubious standard, itself partially based on prior model predictions of attainment under a completely different loading scenario. EPA has failed to offer a reasoned explanation for using the chlorophyll-*a* criteria as the basis for James River allocations in light of these unresolved issues. EPA’s Draft TMDL is also missing evidence that there would be any quantifiable water quality benefit from the billions of dollars that would be required to comply with the allocations. EPA’s determinations on this issue are unreasonable and arbitrary and capricious. For a more detailed discussion of VAMSA’s concerns with regard to this issue, see Appendix 13.

B. EPA’s Bay Model Is Flawed

EPA expects VAMSA members (and others) to comply with an extraordinarily expensive and operationally cumbersome clean-up plan. However, EPA itself has not fulfilled its obligation to

³⁷ Draft TMDL at 6-18.

³⁸ Draft TMDL at 6-18.

ensure that its modeling framework is adequate to support its TMDL and the accompanying WLAs and LAs. If EPA presses forward with finalizing the TMDL over the objections of Bay dischargers and interested stakeholders, despite the faulty model that it has put forth in support of its TMDL, EPA's decision to do so will be arbitrary and capricious.

Like any model, EPA's Bay model is a highly imperfect representation of reality. Over time, EPA has inappropriately shifted to using it in ways that are beyond its capabilities (*e.g.*, predicting D.O. concentrations and non-attainment rates in specific segments to the single percentage point level under far-reaching management scenarios). This has resulted in wide swings in predicted loads and goals with each major model version. VAMSA believes that this instability will continue to occur in the future as the model is periodically modified.

VAMSA objects to overreliance on unstable models to the single percentage point of output, such that environmental policies are undermined with each new model run. A full discussion of VAMSA's concerns with regard to the model is attached hereto as Appendix 14. Although VAMSA generally concurs with EPA's critical period and the use of an implicit margin of safety, there are a number of problematic modeling issues that should cause EPA to shy away from major disruptions to state regulations/policy on the basis of single-digit shifts in model output, including:

- *Lack of full model validation and peer review*
- *The model is being extrapolated beyond the observed range of management controls and living resources*
- *An estimate of model uncertainty should be used to determine the essential equivalence of model scenarios*
- *Inaccuracy of groundwater inputs*
- *Lack of criteria for acceptance of model predictions*
- *Poor chlorophyll-a calibration*
- *Instability and inaccuracy in urban land use assumptions*
- *Missing point sources*
- *Inappropriate application of watershed model to local level*
- *Overparameterized modeling framework*
- *Inconsistent watershed model results*

Each of these is explained in greater detail in Appendix 14.

C. EPA's Backstops Eliminate Planned Agricultural Load Reductions Despite Those Controls Being Among the Most Cost-Effective Measures for Improvement

Section 6 of the Draft TMDL document describes EPA's allocation method for relating relative impact to needed controls. The methodology recognizes that nonpoint sources cannot attain the same levels of control as point sources, and calls for 55-75% of E3 nitrogen controls from nonpoint sources such as agriculture. However, EPA's "backstop" allocations appear to have been accompanied by increases in allocations to nonpoint sources, such that agriculture in many basins fall well short of the intended level of nitrogen control. In so doing, EPA has dispensed

with the fairness/equity concepts developed by its own TMDL work group, and shifted implementation away from the most cost-effective, environmentally beneficial practices.

Overall, EPA's Draft TMDL appears to put Virginia agriculture at a 48% level of nitrogen control (relative to E3), well below the 55-75% level indicated by the relative-effectiveness allocation methodology and far short of controls called for in both Virginia's Tributary Strategy and Draft WIP (Figure 1). This is partly driven by the lower levels of effort in the Potomac River Basin (51%), but primarily driven by an extraordinarily low (17%) level of effort for the James River Basin, which is akin to the 2009 progress levels (Figure 2). VAMSA fails to comprehend how EPA can make deep and costly cuts to other allocations in the James River Basin while concluding that agriculture requires no further improvements in this basin.

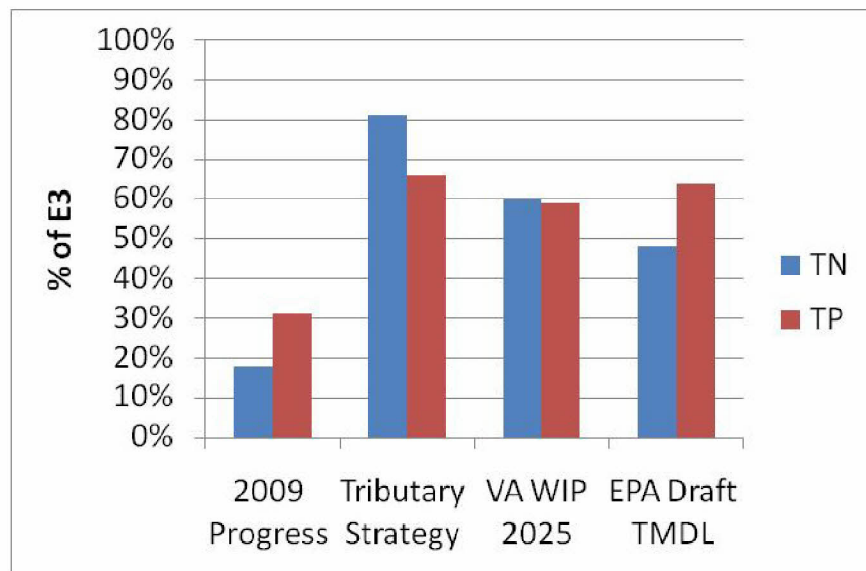


Figure 1: Comparison of agricultural controls among model scenarios

Agricultural management practices include most of the practices that the EPA and others (e.g., Chesapeake Bay Commission, 2004) have identified as the most-cost effective, including nutrient management, conservation tillage, cover crops, and riparian buffers. Relative to many urban and wastewater-based practices, these practices provide high levels of ancillary environmental benefits such as wildlife habitat, stream habitat protection, flood control, and greenhouse gas reduction. To illustrate these points, Appendix 5 presents a case study of alternative nutrient controls for the York River basin using the *BMP Benefit Planner* ver. 1.1.³⁹

³⁹ Malcolm Pirnie, Inc., working on behalf of VAMWA, has developed a spreadsheet based model to compare implementation scenarios with regard to environmental sustainability and cost effectiveness. More specifically, the *BMP Benefit Planner* ver. 1.1 considers energy usage, indirect and direct GHG emissions, carbon sequestration, costs (i.e., capital, operations and maintenance, annualized), and other ancillary benefits (i.e., wildlife habitat,

The case study demonstrates that the D.O.-based overall loading goal can be achieved in a much more cost-effective, environmentally beneficial manner by a different combination of point and nonpoint source controls than reflected in the draft TMDL allocations. VAMSA is providing this example not because we agree with the specific inputs (in particular the urban stormwater aspects), but to make the general point that it is possible to derive a greater environmental benefit at a lower cost if flexibility is allowed in the TMDL. EPA should consider these types of cost issues and options before it finalizes the Bay TMDL. To do otherwise is indefensible.

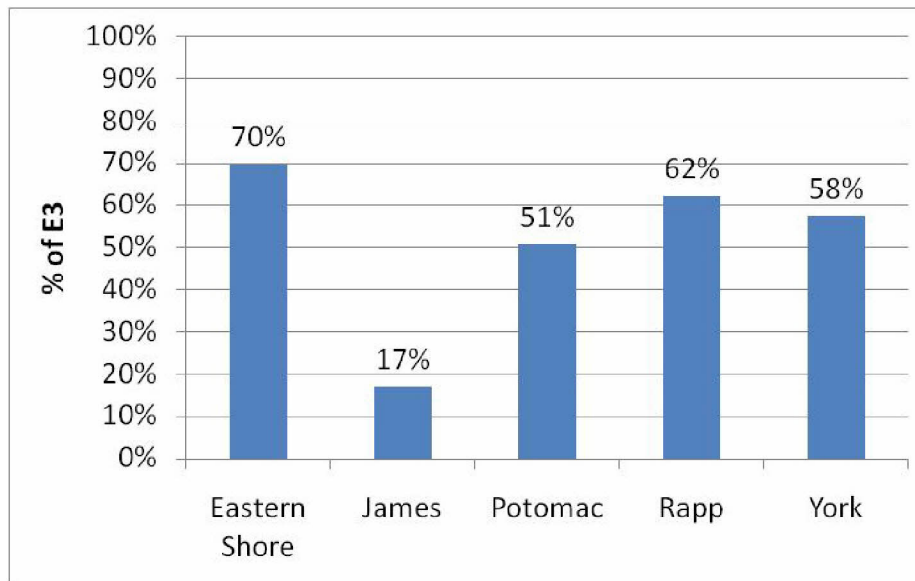


Figure 2: Comparison of agricultural nitrogen controls among basins for EPA's proposed TMDL scenario

VAMSA expects EPA to allocate point and nonpoint sources in an equitable manner that requires a high level of effort from both sectors. In particular, EPA must remedy the low level of agricultural controls proposed for the James River basin, consistent with the widespread understanding that the agricultural sector has abundant opportunities for improvement and cost-effective load reductions.

D. EPA's View Of Relative Effectiveness Is Incorrect

The James and York Rivers have an insignificant effect on Chesapeake Bay D.O. In the 2003 allocation effort, allocations for the James and York River basins were established at "Tributary Strategy" loadings in recognition of the fact that the nutrient loadings for these basins did not significantly influence the mainstem D.O. conditions at segment CB4 and, further, that additional nutrient controls (point and non-point) were warranted for local water quality needs only. This

instream habitat, aesthetics, public health, flood hazard mitigation, and groundwater re-charge and base-flow protection). The model addresses a number of common management practices involving wastewater upgrades and various agricultural and urban practices.

was a fundamental assumption of the 2005 Virginia Tributary Strategies. In 2009, the impact of nutrient reductions on improving mid-Bay D.O. were re-evaluated for the basins with a different approach taken to assess the “relative effectiveness.” VAMSA disagrees with the conclusions EPA reached on this point.

Furthermore, Rappahannock loads are small in relation to other rivers. EPA’s TMDL should, but currently does not, appropriately reflect this point.

VAMSA’s full discussion on relative effectiveness is provided as Appendix 13.

E. EPA’s Failure to Explicitly Include Filter Feeders and Alternative Technologies in the Bay TMDL is Unreasonable

Various studies and the Bay Program’s own modeling efforts have demonstrated that increase biomass of oysters and menhaden have the potential to cause measureable improvements in dissolved oxygen, water clarity, and chlorophyll-*a*. Improvements in these living resources are among the Bay partner’s most important goals, and their water quality benefits should be fully considered in the TMDL process. VAMSA suggests that EPA either (a) adopt nutrient and sediment loading caps that implicitly consider the benefits of filter feeder improvements; (2) explicitly assign a certain proportion of the required load reduction to filter feeder restoration; or (3) allow filter feeder restoration to result in the availability of nutrient credits to offset other sources.

EPA’s Draft TMDL is inconsistent with these recommendations in the Draft TMDL:

EPA is basing the TMDL on the current assimilative capacity of filter feeders at existing populations built into the calibration of the oyster filter feeding submodel...Potential future changes would not be accounted for in the Bay TMDL. If future monitoring data indicate an increase in the filter feeder population, the appropriate jurisdiction’s 2-year milestones delivered load reductions can be adjusted accordingly....⁴⁰

EPA’s decision is inappropriate. Oyster farming and aquaculture show real promise. In mid-October, 2010, several news outlets reported the formation of the State’s first oyster cooperative, Oyster Company of Virginia. A private company formed a cooperative that will allow Virginia’s watermen to lease bottomland from Virginia, plant, grow, harvest and sell oysters. Profits will be plowed back to fuel the endeavor. Although this project is small in scope at this point, it is an important first step, and an excellent example of what Virginians could do to foster aquaculture. These types of efforts should be considered as a part of this TMDL.⁴¹

⁴⁰ Draft TMDL at 10-8.

⁴¹ Note that, according to news reports, the cooperative “...plans to lobby state and federal officials to include their efforts in the “pollution diet” the U.S. Environmental Protection Agency is drafting for the bay.” Daily Press, Oct. 13, 2010. Attached as Appendix 15.

In addition, VAMSA supports EPA's efforts to consider the role of Atlantic menhaden in relation to management of chlorophyll-*a*.⁴² Recent modeling work has shown that their migration into the tributaries and associated consumption of algae has the potential to affect chlorophyll-*a* and associated compliance with the standards. Although menhaden stocks do not appear to dramatically reduce chlorophyll (as long term averages) their incremental effects are considered comparable to nutrient reduction. VAMSA recommends that additional analyses be conducted to evaluate menhaden effects on seasonal peaks and/or worst years in the record. Further, additional modeling enhancements should be made such that the menhaden migration and residence time varies according to a food gradient. A number of papers indicate that menhaden consumption of algae increases in areas with higher chlorophyll-*a*. This is logical since the species would remain longer in an area with greater availability of food. Because the model does not presently capture these foraging effects the available reductions in chlorophyll due to menhaden (especially during bloom conditions) could be under-estimated.

In addition to filter feeders, VAMSA also recommends that some portion of future reductions needed to meet water quality goals should be assigned to technological advancements, such as the Algal Turf Scrubber[®] ("ATS") and floating wetlands. Although these alternative technologies may not be ready for full deployment Bay-wide, EPA should acknowledge and encourage their possible future use in the Bay TMDL, including assisting with funding, to encourage research and development. Spending money on research that could make a major dent in clean-up efforts is far preferable to spending money on expensive MS4 retrofits.

EPA has established an extraordinarily aggressive approach in its Draft TMDL, but it has not left any room for the natural progression of technology—technology that could greatly assist in making nutrient and sediment reductions in lieu of expensive additional POTW upgrades.

For these reasons, EPA should revise its Draft TMDL to assign some portion of future reductions to filter feeders and alternative technologies.

F. EPA's Failure to Aggressively Target Air Deposition Is Unreasonable

CBPO has estimated that atmospheric sources account for about **one third** of the nitrogen that reaches the Bay, and the majority of this load originates from outside the Chesapeake Bay watershed. CBPO has developed airshed model scenarios representing various levels of atmospheric load reduction. Given the magnitude of the load derived from atmospheric sources, it is critical that these sources bear a proportional operational and financial responsibility for load reduction, and other sectors not be negatively impacted due to lack of atmospheric load reductions. This may require the CBPO to model and pursue regulatory strategies that are beyond existing or proposed regulations, including atmospheric controls specifically targeted toward water quality protection.

EPA's Draft TMDL is lacking with regard to air deposition, and EPA is being complacent in aggressively chasing down additional reductions from this key source sector. EPA has lackadaisically accepted what other programs are planning for air pollution reductions as good

⁴² See also discussion of menhaden at Appendix 13 (referenced in Section VI(A) above).

enough. In addition, EPA's decision to require Virginians to clean up nutrients that are deposited on our land from states outside the Watershed begs for a better approach to source reductions.

G. The American Canoe and Kingman Park Consent Decrees Do Not Address Virginia Chlorophyll-*a*

EPA continues to assert in it must complete the Bay TMDL by 2011 (the December, 2010 deadline is a self-imposed acceleration) because of two consent decrees issued in the late 1990/early 2000 timeframe, American Canoe Association, Inc. v. EPA, Civil Action No. 98-99-A (E.D. Va. 1999)⁴³ and Kingman Park Civic Association v. EPA, Case No. 1:98CV00758 (E.D. Va. 2000). Draft TMDL at 1-14 – 1-16.

VAMSA submits that EPA's obligations to develop a TMDL by May, 2011 do not extend to establishing loadings on the James River for chlorophyll-*a*. As the earlier discussion of the history of the establishment of the standard (see Section VI(A) above) illustrates, the James River chlorophyll-*a* standard was not even adopted until 2005. In contrast, the American Canoe Consent Decree was signed and filed in Federal Court in 1999 and covers TMDLs on the then-existing 1998/99 303(d) list for Virginia. It is therefore impossible that EPA's obligation from the American Canoe Consent Decree extends to chlorophyll-*a* on the James given that the standard did not even come into existence until 6 years later. Although EPA has wrapped James chlorophyll up into this TMDL, it is not obligated to do so, and should not have done so in light of the major concerns expressed regarding the existing standard.

⁴³ Attached hereto as Appendix 16.